DOCUMENT RESUME

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ABSTRACT

This manual is a guide to an interactive training program designed to address key skills necessary in today's high performance workplace. The module is intended to meet the learning needs of production workers who may have limited basic skills or literacy. This module presents a six-step problem-solving model: brainstorming; analyzing cause and effect; ranking priorities, identifying potential causes of a problem, designing a corrective action plan, and presenting solutions. Employees who use the module learn the six steps on a simulated case study, and advance to a real-life problem that is written by their supervisors in an accompanying supervisor session. The module contains six 1-1/2 hour lessons that cover the following topics: (1) there's no business like everybody's business; (2) what's going on here?; (3) something's fishy; (4) what needs to be fixed--and what are we going to do about it!; (5) let's fix it!; and (6) welcome to the real world! The training manual includes an instructor's guide that contains activities for each lesson, transparency masters and student handouts, information sheets, teaching suggestions, and pre- and posttests; and a supervisor's guide that contains two lessons on finding solutions that work. (KC)

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ED 426 307

Winning At Work

Solving Problems

Finding Solutions That Work

- There's No Business Like Everybody's Business
- What's Going On Here?
- Something's Fishy
- What Needs to be Fixed
- Let's Fix It!
- Welcome to the Real World!

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CE 078 642

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An Introduction

This module focuses on helping the employee find and solve critical work related problems. The module centers around a six step problem solving model that includes: Brainstorming, Analyzing Cause and Effect (Fishbone Analysis), Ranking Priorities (Pareto Analysis), Identifying Potential Causes of a Problem, Designing a Corrective Action Plan, and Presenting Solutions. The employees will learn the six steps on a simulated case study and advance to a real life problem.

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Module 7 Materials

Materials	Lesson#
Name tags	All
Paper	All
Pencils	All
Transparency Markers	All
Flip chart/Whiteboard markers	All
Colored Index cards	1
Colored Team Flags	1
Colored Team Storage Folders	1
Stress Balls (Balloons filled with flour or sand and tied at the top)	1
Calculators	4

Equipment	Lesson#
Overhead projector	All
Flip chart/Whiteboard	All

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JobLink

Winning At Work

Solving Problems

Finding Solutions That Work

Lesson 1
There's No Business Like Everybody's Business

Lesson Description

There are many different problem-solving models. Many of them contain the components presented in this module. It is important to point out to employees that problem-solving models differ from company to company and that the steps covered in this module may not exactly parallel the steps used by their company.

This lesson *introduces* the Six Steps of **Solving Problems** that will be covered in the solving problem module.

First, as a large group, employees receive a brief introduction to the problem-solving steps. Then the instructor forms teams of employees.

Employees remain on their team throughout the module. The instructor collects team materials at the conclusion of each lesson and stores materials in a colored folder matching each team's color.

Teams work together to complete the "Lesson 1 Word Power" handout that introduces the vocabulary associated with this lesson.

Teams familiarize themselves with the "Model Problem." Before reading this account, employees preview the worksheet they will use in the following lesson asking them to list relevant details of the account.

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Objectives

By completing this lesson, employees will work in teams to:

1. **Demonstrate** comprehension of the problem-solving vocabulary used in this lesson.
2. **Locate** details of a manufacturing problem in a written account.

Materials Needed

Hardware

1. Overhead projector
2. Transparency markers
3. Flip chart or whiteboard
4. Whiteboard markers
5. Colored cards

Materials Needed

Hardware (cont'd)

6. Colored team flags
7. Colored team storage folders
8. Audiotape of Model Problem with accompanying pictures (optional)
9. Stress Balls, or pictures of Stress Balls (suggested) (Balloons, filled with flour or sand and tied with a knot at the top.)

Forms

"Pretest"

"Learner Enrollment"

Transparencies

"Module Preview" (Transparency 1)

"Lesson 1 Word Power" (Transparency 2)

"Model Problem: Stress Balls at EPGC" (Transparency 3)

"Organize the Details" (Transparency 4)

"Step-by-Step" cards (Card 1)

Materials Needed

Handouts

"Module Preview" (Handout 1)

"Lesson 1 Word Power" (Handout 2)

"Model Problem: Stress Balls at EPGC" (Handout 3)

"Organize the Details" (Handout 4)

"Step-by-Step" cards (Card 1)

Classroom Set-up

Total Time: 90 minutes

Opening- Large Group	25 min.
First Activity- Small Groups	15 min.
Second Activity- Small Groups	35 min.
Ending- Large Group	15 min.

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Key Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet

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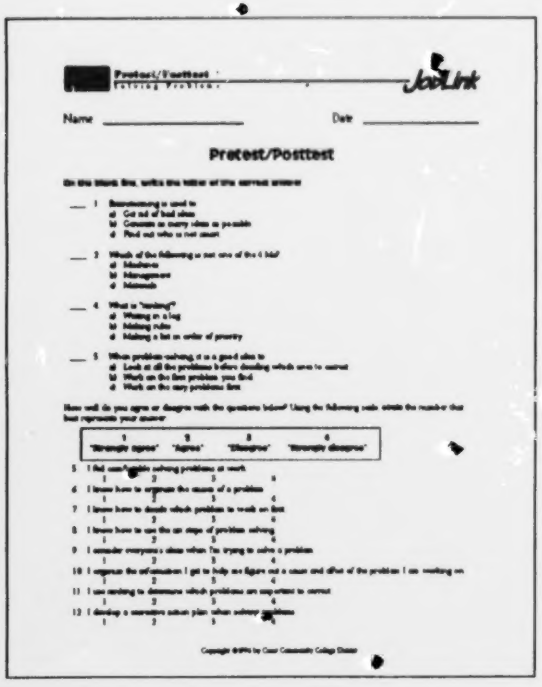

Name _____ Date _____

Pretest/Posttest

On the blank line, write the letter of the correct answer.

___ 1 Brainstorming is used to
a) Get out of bad ideas
b) Generate as many ideas as possible
c) Find out who is not smart

___ 2 Which of the following is not one of the 4 Ms?
a) Machine
b) Management
c) Manmade

___ 4 What is "ranking"?
a) Writing in a log
b) Making rules
c) Making a list in order of priority

___ 5 When problem solving, it is a good idea to
a) Look at all the problems before deciding which ones to correct
b) Work on the first problem you find
c) Work on the easy problems first

How well do you agree or disagree with the questions below? Using the following scale, circle the number that best represents your answer.

1	2	3	4
"Strongly agree"	"Agree"	"Disagree"	"Strongly disagree"

5 I find it comfortable solving problems at work.
1 2 3 4
6 I know how to organize the causes of a problem.
1 2 3 4
7 I know how to decide which problem to work on first.
1 2 3 4
8 I know how to use the six steps of problem solving.
1 2 3 4
9 I consider everyone's ideas when I'm trying to solve a problem.
1 2 3 4
10 I organize the information I get to help me figure out a cause and effect of the problem I am working on.
1 2 3 4
11 I am working to determine which problems are easy ones to correct.
1 2 3 4
12 I develop a corrective action plan when solving problems.
1 2 3 4

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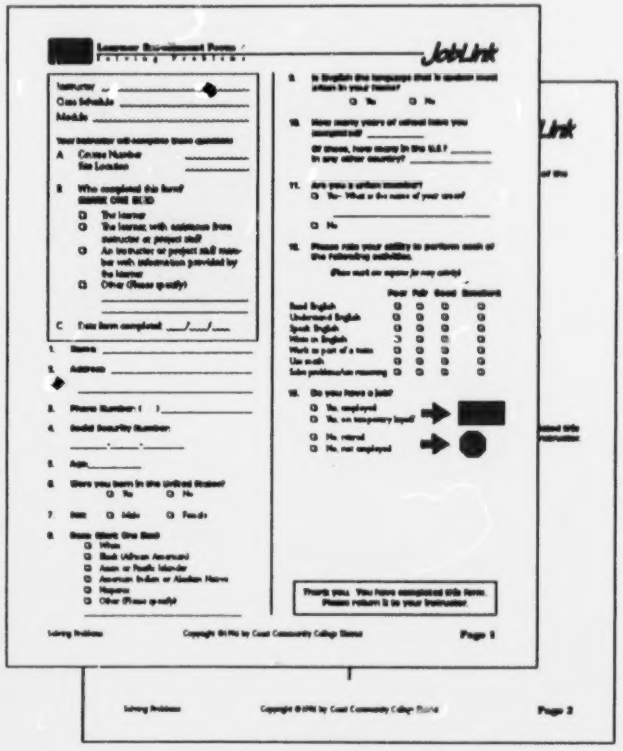
Form



Learner Enrollment Form / Solving Problems / JobLink

Instructor _____
Class Schedule _____
Module _____

Your instructor will complete these questions

A Course Number _____
Site Location _____

B Who completed this form?
MARK ONE BOX
- ☐ The learner
- ☐ The learner, with assistance from instructor or project staff
- ☐ An instructor or project staff member with information provided by the learner
- ☐ Other (Please specify) _____

C Date form completed ___/___/____

1. Name _____
2. Address _____
3. Phone Number ( ) _____
4. Social Security Number ___-___-____
5. Age _____
6. Were you born in the United States? ☐ Yes ☐ No
7. Sex ☐ Male ☐ Female
8. Race. Mark One Box
- ☐ White
- ☐ Black (African American)
- ☐ Asian or Pacific Islander
- ☐ American Indian or Alaskan Native
- ☐ Hispanic
- ☐ Other (Please specify) _____

9. Is English the language that is spoken most often in your home? ☐ Yes ☐ No
10. How many years of school have you completed? _____
Of those, how many in the U.S.? _____
In any other country? _____
11. Are you a union member?
☐ Yes What is the name of your union? _____
☐ No
12. Please rate your ability to perform each of the following activities.
(You may use more than one entry)

	Poor	Fair	Good	Excellent
Read English	☐	☐	☐	☐
Understand English	☐	☐	☐	☐
Speak English	☐	☐	☐	☐
Write in English	☐	☐	☐	☐
Work as part of a team	☐	☐	☐	☐
Use math	☐	☐	☐	☐
Solve problems/use reasoning	☐	☐	☐	☐

13. Do you have a job?
- ☐ Yes, employed → [redacted]
- ☐ Yes, on temporary layoff → [redacted]
- ☐ No, retired → ●
- ☐ No, not employed → ●

Thank you. You have completed this form. Please return it to your instructor.

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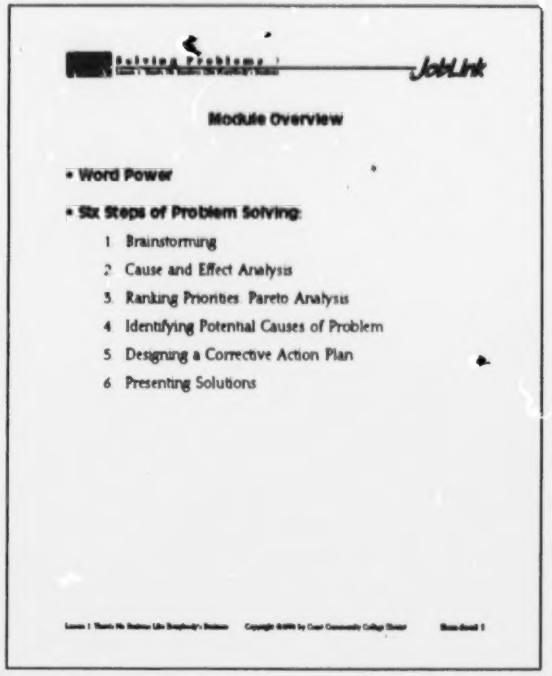
Form



Solving Problems / JobLink

Module Overview

- **Word Power**
- **Six Steps of Problem Solving:**
  1. Brainstorming
  2. Cause and Effect Analysis
  3. Ranking Priorities: Pareto Analysis
  4. Identifying Potential Causes of Problem
  5. Designing a Corrective Action Plan
  6. Presenting Solutions

Lesson 1: There's No Business Like Everybody's Business Copyright ©1996 by Coast Community College District Blackboard 1

Handout 1, Transparency 1

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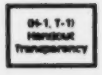
Activities

Opening: 15 Minutes

1. Have employees sign in and wear name tags *(if necessary)*.
2. **Welcome** employees.

3. **Complete** "Learner Enrollment Form" and "Pretest".



4. **Preview** the "Module Preview". Use this time to give the employees a general introduction to team problem solving. *(Please refer to the Trainer Notes.)*
5. **Ask** employees if they have any problem-solving experience.

6. **Divide** employees into teams of 4 to 6 using either of the following methods:
    a. **Ask** the company facilitator to help you form the teams. You may want to group employees in teams of employees who are accustomed to working together or in teams of employees who do not work together. Then give each employee a colored card that corresponds to his or her new team color.
    b. **Form** teams randomly by dealing colored cards to employees. Each color is a team color.
7. Whichever method you choose, **set up** colored flags. When employees have their cards, **tell** them to assemble with their teammates by the appropriate flag.

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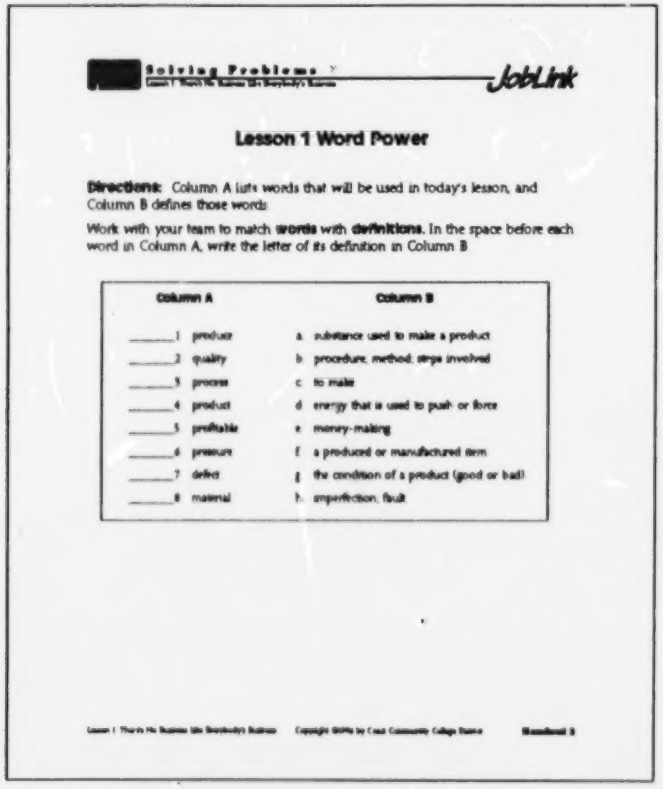

Solving Problems — JobLink

Lesson 1 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A		Column B
_____1	product	a. substance used to make a product
_____2	quality	b. procedure, method, steps involved
_____3	process	c. to make
_____4	product	d. energy that is used to push or force
_____5	profitable	e. money-making
_____6	pressure	f. a produced or manufactured item
_____7	defect	g. the condition of a product (good or bad)
_____8	material	h. imperfection, fault

Lesson 1: There's No Business Like Everybody's Business Copyright ©1996 by Coast Community College District Handout 2

Handout 2, Transparency 2

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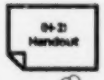
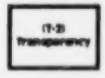
Activities

First Activity: 15 Minutes



1. **Explain** to the teams how to fill out their "Lesson 1 Word Power".

2. **Assist** the team members as needed.



3. **Update** the master "Lesson 1 Word Power" periodically with the correct answers as the teams work. For some classes, you may need to write immediate hints on the transparency.

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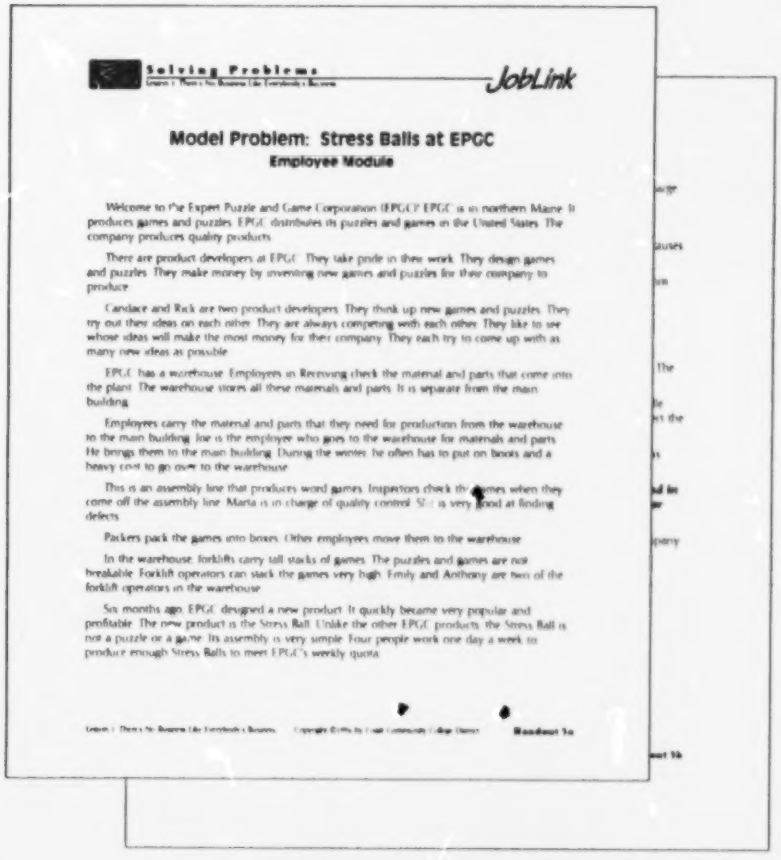


Solving Problems — JobLink

Model Problem: Stress Balls at EPGC
Employee Module

Welcome to the Expert Puzzle and Game Corporation (EPGC)! EPGC is in northern Maine. It produces games and puzzles. EPGC distributes its puzzles and games in the United States. The company produces quality products.

There are product developers at EPGC. They take pride in their work. They design games and puzzles. They make money by inventing new games and puzzles for their company to produce.

Candace and Rick are two product developers. They think up new games and puzzles. They try out their ideas on each other. They are always competing with each other. They like to see whose ideas will make the most money for their company. They each try to come up with as many new ideas as possible.

EPGC has a warehouse. Employees in Receiving check the material and parts that come into the plant. The warehouse stores all these materials and parts. It is separate from the main building.

Employees carry the material and parts that they need for production from the warehouse to the main building. Joe is the employee who goes to the warehouse for materials and parts. He brings them to the main building. During the winter, he often has to put on boots and a heavy coat to go over to the warehouse.

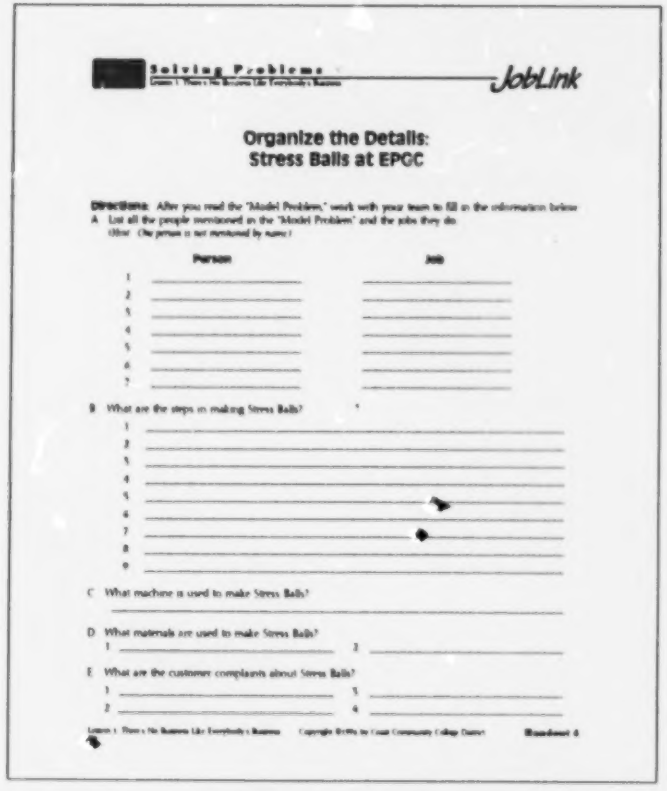
This is an assembly line that produces word games. Inspectors check the games when they come off the assembly line. Maria is in charge of quality control. She is very good at finding defects.

Packers pack the games into boxes. Other employees move them to the warehouse.

In the warehouse, forklifts carry tall stacks of games. The puzzles and games are not breakable. Forklift operators can stack the games very high. Emily and Anthony are two of the forklift operators in the warehouse.

Six months ago, EPGC designed a new product. It quickly became very popular and profitable. The new product is the Stress Ball. Unlike the other EPGC products, the Stress Ball is not a puzzle or a game. Its assembly is very simple. Four people work one day a week to produce enough Stress Balls to meet EPGC's weekly quota.

Handout 3, Transparency 3



Solving Problems — JobLink

Organize the Details:
Stress Balls at EPGC

Directions: After you read the "Model Problem," work with your team to fill in the information below.

A. List all the people mentioned in the "Model Problem" and the jobs they do.
(Note: One person is not mentioned by name.)

	Person	Job
1		
2		
3		
4		
5		
6		
7		

B. What are the steps in making Stress Balls?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

C. What machine is used to make Stress Balls?

_____

D. What materials are used to make Stress Balls?

1. _____ 3. _____

E. What are the customer complaints about Stress Balls?

1. _____ 3. _____
2. _____ 4. _____

Handout 4, Transparency 4

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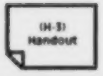
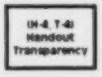
Activities

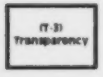
Second Activity: 35 Minutes



1. **Distribute** "Model Problem: Stress Balls at EPGC".



2. **Distribute** "Organize the Details", **project** it, and **review** it section by section in an effort to prepare teams for the reading selection.



3. **Project** the "Model Problem" on the overhead.

4. **Play** the "Model Problem" audiotape, if available, or read the account slowly. If available, **show** slides or transparencies depicting the action in the account, showing the characters, and demonstrating the process of making Stress Balls. **Pass around** sample Stress Balls, if available.

5. **Ask** teams to silently reread the handouts of "Model Problem: Stress Balls at EPGC" while the account remains projected on the overhead.

6. **Assist** team members with vocabulary and help them comprehend details, if necessary.

7. **Remind** team members that they will identify the important details of this story in the next lesson.

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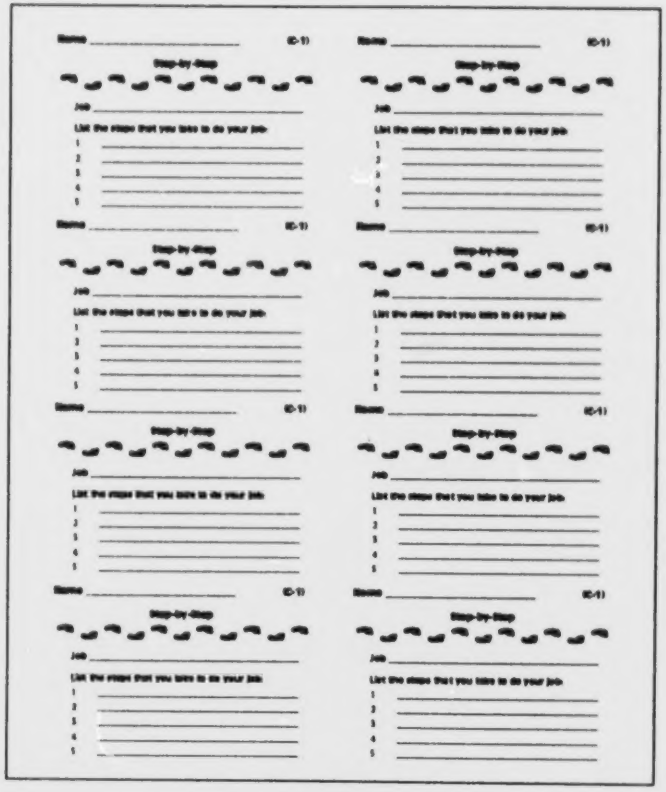

Cards 1

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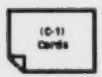
Activities

Ending: 15 Minutes



1. **Distribute** "Step-by-Step" cards. **Tell** employees to fill in their names, write down their jobs, and list the steps they take in their jobs. **Ask** employees to take the cards with them, fill them out, and bring them to the next lesson.

2. **Save** collected work in colored folders.

3. **Say** good-bye.

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Winning At Work

Solving Problems

Finding Solutions That Work

Lesson 2
What's Going On Here?

Lesson Description

This lesson focuses on **Brainstorming,** the first of the Six Steps of Problem Solving covered in this module.

Employees review the Model Problem" and then break into teams. In teams, they work on the "Lesson 2 Word Power" activity, they complete the "Organize the Details" handout, and they do the "Brainstorming" activity.

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Objectives

By completing this lesson, employees will work in teams to:

1. **Demonstrate** comprehension of the vocabulary related to brainstorming.
2. **Organize** details.
3. **Utilize** the brainstorming technique to generate ideas to use later in solving the "Model Problem."

Materials Needed

Hardware

1. Overhead projector
2. Transparency markers
3. Flip chart or whiteboard
4. Whiteboard markers
5. Colored team folders from previous lesson

Transparencies

"Organize the Details" (Transparency 4)
"Lesson 2 Word Power" (Transparency 5)
"Brainstorming" (Transparency 6)
"Brainstorming" cards (Card 2)

Materials Needed

Handouts

"Organize the Details" (Handout 4)
"Lesson 2 Word Power" (Handout 5)
"Brainstorming" (Handout 6)
"Brainstorming" cards (Card 2)

Classroom Set-up

Total Time: 90 minutes

Opening- Large Group	5 min.
First Activity- Pairs	15 min.
Second Activity- Small Groups	10 min.
Third Activity- Small Groups	20 min.
Fourth Activity- Small Groups	25 min.
Ending- Large Group	15 min.

Key Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet

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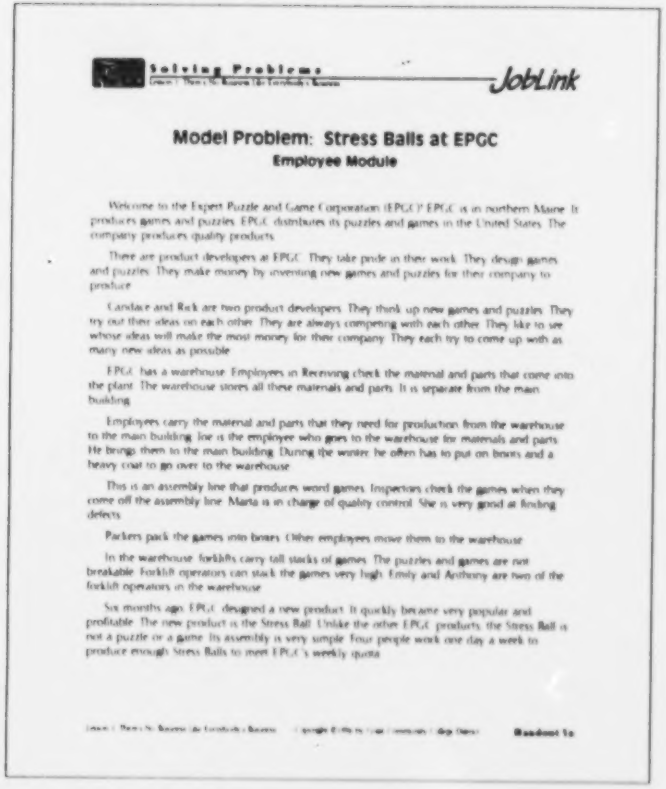


Solving Problems
JobLink

Model Problem: Stress Balls at EPGC
Employee Module

Welcome to the Expert Puzzle and Game Corporation (EPGC)! EPGC is in northern Maine. It produces games and puzzles. EPGC distributes its puzzles and games in the United States. The company produces quality products.

There are product developers at EPGC. They take pride in their work. They design games and puzzles. They make money by inventing new games and puzzles for their company to produce.

Candace and Rick are two product developers. They think up new games and puzzles. They try out their ideas on each other. They are always competing with each other. They like to see whose ideas will make the most money for their company. They each try to come up with as many new ideas as possible.

EPGC has a warehouse. Employees in Receiving check the material and parts that come into the plant. The warehouse stores all these materials and parts. It is separate from the main building.

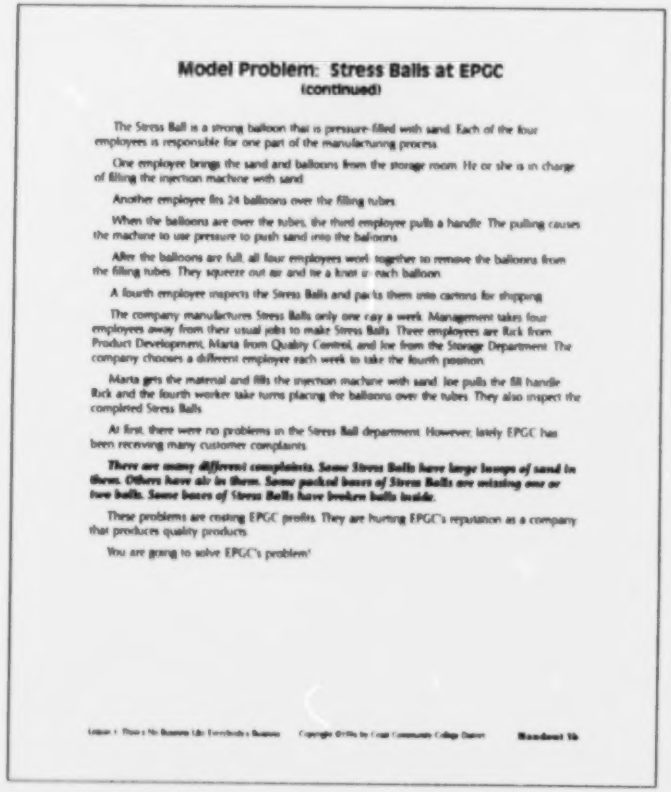
Employees carry the material and parts that they need for production from the warehouse to the main building. Joe is the employee who goes to the warehouse for materials and parts. He brings them to the main building. During the winter, he often has to put on boots and a heavy coat to go over to the warehouse.

This is an assembly line that produces word games. Inspectors check the games when they come off the assembly line. Marta is in charge of quality control. She is very good at finding defects.

Packers pack the games into boxes. Other employees move them to the warehouse.

In the warehouse, forklifts carry tall stacks of games. The puzzles and games are not breakable. Forklift operators can stack the games very high. Emily and Anthony are two of the forklift operators in the warehouse.

Six months ago, EPGC designed a new product. It quickly became very popular and profitable. The new product is the Stress Ball. Unlike the other EPGC products, the Stress Ball is not a puzzle or a game. Its assembly is very simple. Four people work one day a week to produce enough Stress Balls to meet EPGC's weekly quota.



Model Problem: Stress Balls at EPGC
(continued)

The Stress Ball is a strong balloon that is pressure-filled with sand. Each of the four employees is responsible for one part of the manufacturing process.

One employee brings the sand and balloons from the storage room. He or she is in charge of filling the injection machine with sand.

Another employee fits 24 balloons over the filling tubes.

When the balloons are over the tubes, the third employee pulls a handle. The pulling causes the machine to use pressure to push sand into the balloons.

After the balloons are full, all four employees work together to remove the balloons from the filling tubes. They squeeze out air and tie a knot in each balloon.

A fourth employee inspects the Stress Balls and packs them into cartons for shipping.

The company manufactures Stress Balls only one day a week. Management takes four employees away from their usual jobs to make Stress Balls. Three employees are Rick from Product Development, Marta from Quality Control, and Joe from the Storage Department. The company chooses a different employee each week to take the fourth position.

Marta gets the material and fills the injection machine with sand. Joe pulls the fill handle. Rick and the fourth worker take turns placing the balloons over the tubes. They also inspect the completed Stress Balls.

At first, there were no problems in the Stress Ball department. However, lately EPGC has been receiving many customer complaints.

There are many different complaints. Some Stress Balls have large lumps of sand in them. Others have air in them. Some packed boxes of Stress Balls are missing one or two balls. Some boxes of Stress Balls have broken balls inside.

These problems are costing EPGC profits. They are hurting EPGC's reputation as a company that produces quality products.

You are going to solve EPGC's problem!

Handout 3

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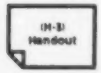
Activities

Opening: 5 Minutes

1. Have employees sign in and wear name tags *(if necessary)*.
2. **Welcome** employees.



3. **Review** the "Model Problem" from last lesson.

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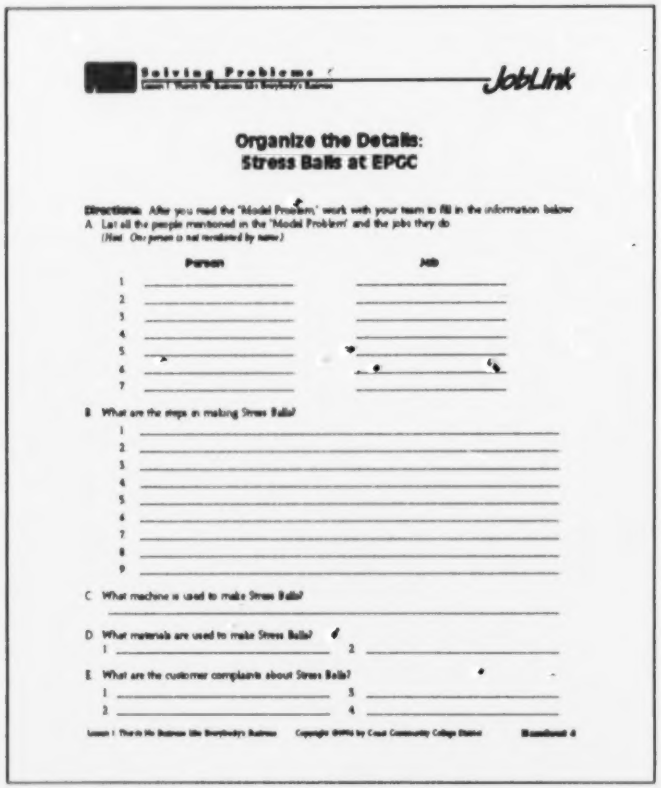

Solving Problems
JobLink

Organize the Details:
Stress Balls at EPCC

Directions: After you read the "Model Problem," work with your team to fill in the information below.

A. List all the people mentioned in the "Model Problem" and the jobs they do.
(Hint: One person is not mentioned by name.)

	Person	Job
1		
2		
3		
4		
5		
6		
7		

B. What are the steps in making Stress Balls?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

C. What machine is used to make Stress Balls?

_____

D. What materials are used to make Stress Balls?

1. _____ 2. _____

E. What are the customer complaints about Stress Balls?

1. _____ 3. _____
2. _____ 4. _____

Lesson 1: There's No Business Like Everybody's Business Copyright ©1996 by Coast Community College District Handout 4

Handout 4, Transparency 4

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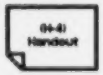
Activities

First Activity: 15 Minutes

1. **Project** "Organize the Details".

2. **Work in pairs** to fill out the "Organize the Details". When employees need immediate hints, write them on a blank transparency.



3. **Complete** the "Organize the Details" with employees' input.

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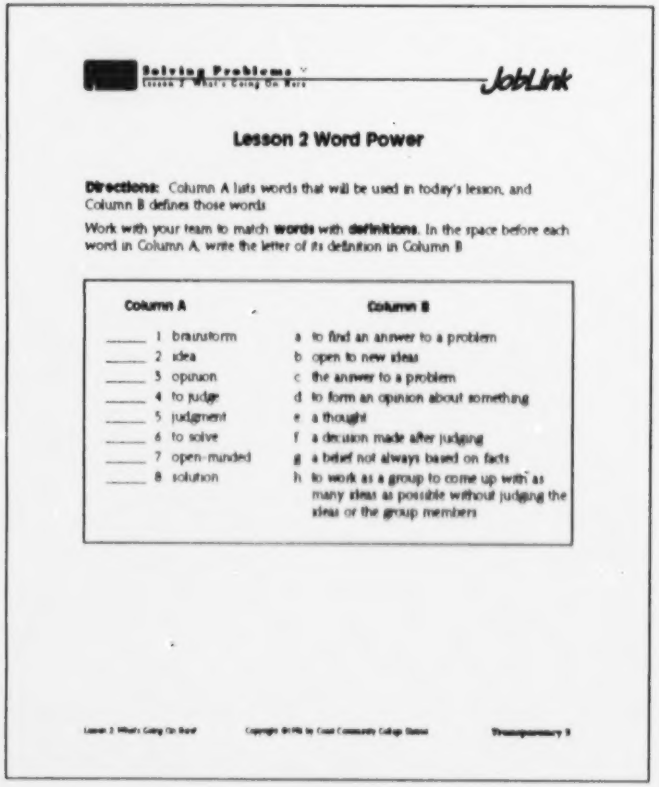
Solving Problems
Lesson 2: What's Going On Here
JobLink

Lesson 2 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. brainstorm	a. to find an answer to a problem
_____ 2. idea	b. open to new ideas
_____ 3. opinion	c. the answer to a problem
_____ 4. to judge	d. to form an opinion about something
_____ 5. judgment	e. a thought
_____ 6. to solve	f. a decision made after judging
_____ 7. open-minded	g. a belief not always based on facts
_____ 8. solution	h. to work as a group to come up with as many ideas as possible without judging the ideas or the group members

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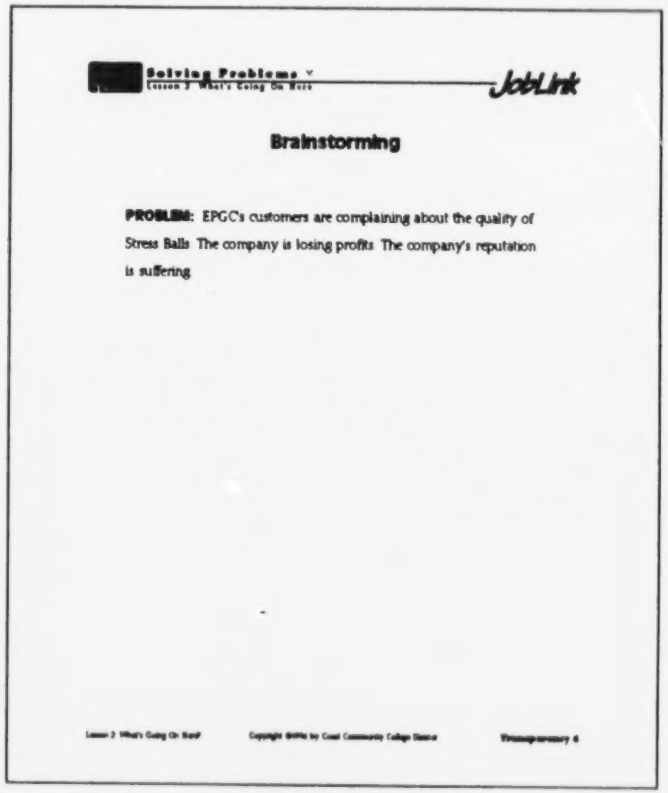
Transparency 5


Solving Problems
Lesson 2: What's Going On Here
JobLink

Brainstorming

PROBLEM: EPGC's customers are complaining about the quality of Stress Balls. The company is losing profits. The company's reputation is suffering.

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Transparency 6

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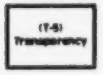
Activities

Second Activity: 10 Minutes

1. **Project** "Brainstorming". **Read** the problem identified.

2. **Explain** the process of brainstorming.



3. **Explain** that when the employees break into groups, they will first work together on "Lesson 2 Word Power", and then they will brainstorm possible reasons for the model problem.

4. **Encourage** all team members to volunteer their ideas in their group discussions. **Remind** them that in brainstorming:

    a. No idea is bad; no idea is insignificant.
    b. Employees should not criticize, ridicule, or otherwise discourage other employees ideas.
    c. A weak idea often helps generate a strong idea!
    d. The group should consider *all* ideas.

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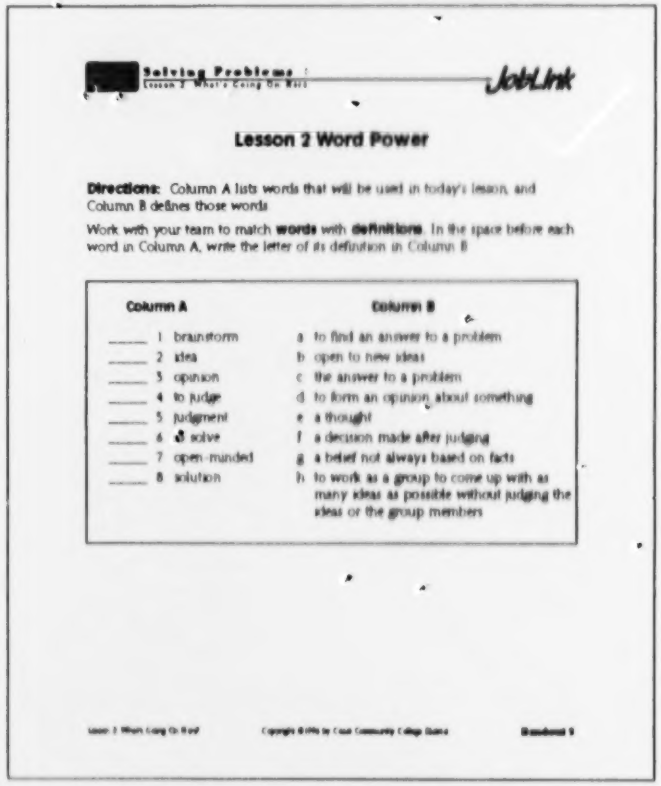

Solving Problems : Lesson 2: What's Going On Here? JobLink

Lesson 2 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions**. In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. brainstorm	a. to find an answer to a problem
_____ 2. idea	b. open to new ideas
_____ 3. opinion	c. the answer to a problem
_____ 4. to judge	d. to form an opinion about something
_____ 5. judgment	e. a thought
_____ 6. to solve	f. a decision made after judging
_____ 7. open-minded	g. a belief not always based on facts
_____ 8. solution	h. to work as a group to come up with as many ideas as possible without judging the ideas or the group members

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Handout 5, Transparency 5

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Activities

Third Activity: 20 Minutes

(H-5) Handout

1. **Tell** employees to work in teams to fill out their "Lesson 2 Word Power".

2. **Assist** team members from time to time, as needed.

(T-5) Transparency

3. **Periodically update** the master "Lesson 2 Word Power" with the correct answers as the employees work.

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Solving Problems
JobLink
Brainstorming
PROBLEM: EPGC's customers are complaining about the quality of Stress Balls. The company is losing profits. The company's reputation is suffering.

Handout 6, Transparency 6

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Activities

Fourth Activity: 25 Minutes

1. **Distribute** "Brainstorming" and **project** the transparency.

2. **Tell** employees to begin brainstorming! **Encourage** teams to come up with as many ideas as they can concerning the problem at EPGC.

3. **Ask** each team to designate a *scribe* or *secretary* to write down team members' ideas.

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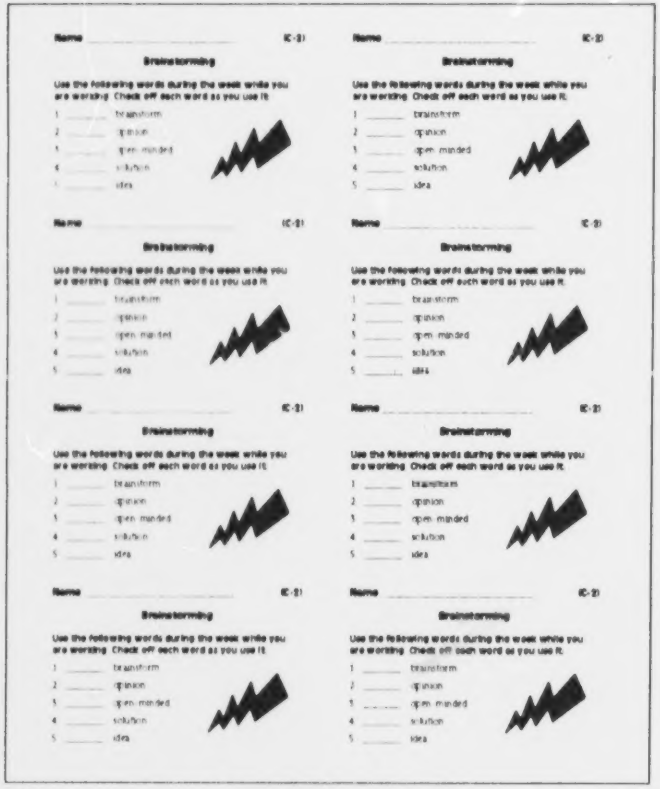


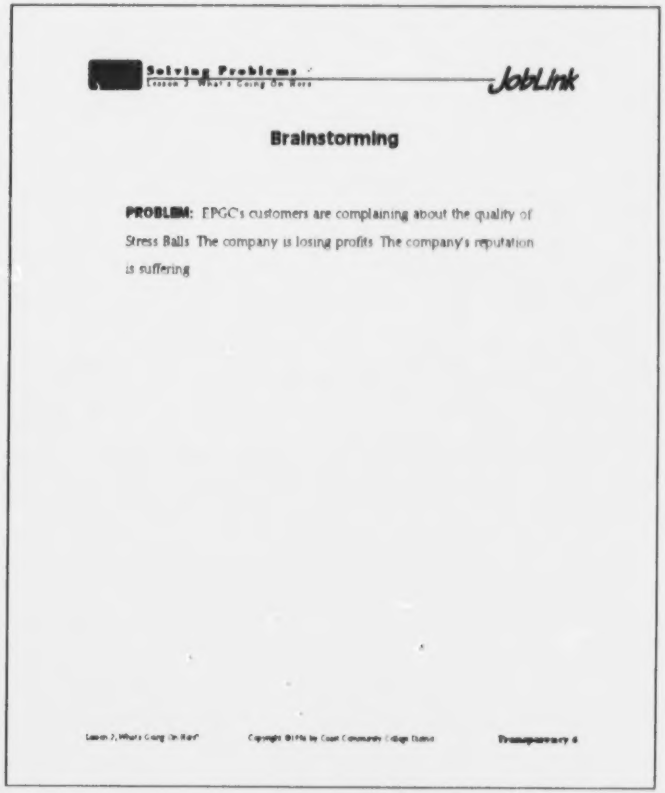
Name _____ (C-2)

Brainstorming

Use the following words during the week while you are working. Check off each word as you use it.

1 _____ brainstorm
2 _____ opinion
3 _____ open-minded
4 _____ solution
5 _____ idea

Cards 2



Solving Problems
Lesson 2: What's Going On Here?
JobLink

Brainstorming

PROBLEM: EPGC's customers are complaining about the quality of Stress Balls. The company is losing profits. The company's reputation is suffering.

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Transparency 6

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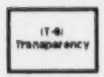
Activities

Ending: 10 Minutes



1. **Fill in** the "Brainstorming" with employees' input. **Instruct** the scribes to use the handout to write any ideas that are not omitted from the transparency. **Allow** employees to make their own copies of their team handout.

2. **Distribute** Brainstorming cards. **Remind** employees that they are to use the words on the card during the following week.

3. **Save** work in folders.

4. If time permits, **invite** employees to brainstorm ways their company might get employees to go back to school.

5. **Say** good-bye.

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JobLink

Winning At Work

Solving Problems

Finding Solutions That Work

Lesson 3
Something's Fishy

Lesson Description

This lesson focuses on **Cause-and-Effect Analysis**, the second of the Six Steps of Problem Solving covered in this module.

Working in teams, employees refer to the "Brainstorming" handout that they filled in during the previous lesson. Still in teams, they complete the "Lesson 3 Word Power" worksheet and the "Cause and Effect Diagram."

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Objectives

By completing this lesson, employees will work in teams to:

1. **Demonstrate** comprehension of the vocabulary covered in this lesson.
2. **Organize** the ideas that they generated through brainstorming into the 4 Ms: Materials, Manpower, Machines, and Methods.

Materials Needed

Hardware

1. Overhead projector
2. Transparency markers
3. Flip chart or whiteboard
4. Whiteboard markers
5. Colored team folders from previous lesson

Transparencies

"Lesson 3 Word Power" (Transparency 7)
"Cause-and-Effect Diagram" (Transparency 8)

Materials Needed

Handouts

"Lesson 3 Word Power" (Handout 7)
"Cause-and-Effect Diagram" (Handout 8)
"Fishbone Diagram" cards (Card 3)

Classroom Set-up

Total Time: 90 minutes

Opening- Large Group	10 min.
First Activity- Small Groups	25 min.
Second Activity- Small Groups	45 min.
Ending- Large Group	10 min.

Key Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet

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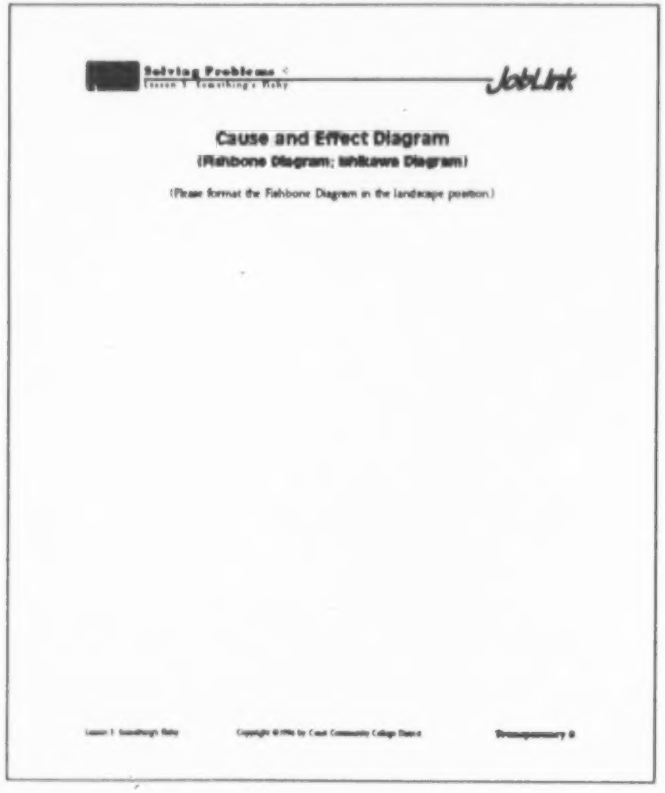
Solving Problems
JobLink
Cause and Effect Diagram
(Fishbone Diagram; Ishikawa Diagram)
(Please format the Fishbone Diagram in the landscape position.)

Transparency 8

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Activities

Opening: 10 Minutes

1. **Have** employees sign in and wear name tags *(if necessary)*.

2. **Welcome** employees.

3. **Review** "Brainstorming" from last lesson.

4. **Explain** that brainstorming generates many ideas–some useful and some not; some to keep and consider and others to discard. **Explain** that this lesson will help teams *organize* these ideas into categories.

5. **Project** the "Cause-and-Effect Diagram", often called a "Fishbone Diagram" *(because it resembles a fish skeleton)* or an "Ishikawa Diagram" *(after its designer)*.

6. **Explain** Cause-and-Effect Analysis.

7. **Tell** employees that when they break into groups, they will work first on "Lesson 3 Word Power."

8. **Explain** employees that they will then work together to fill in the "Cause-and- Effect Diagram."

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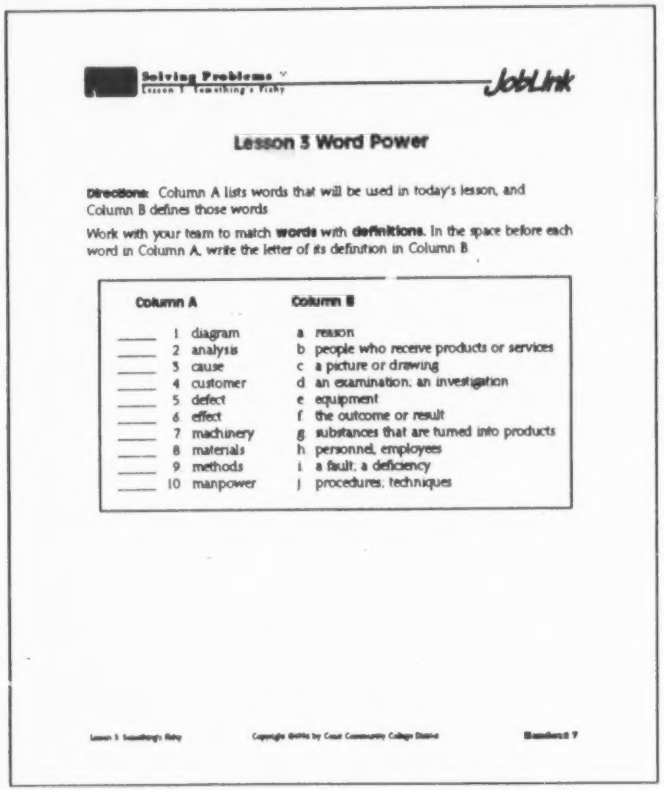

Solving Problems
Lesson 3: Something's Fishy
JobLink

Lesson 3 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A		Column B
____	1 diagram	a reason
____	2 analysis	b people who receive products or services
____	3 cause	c a picture or drawing
____	4 customer	d an examination; an investigation
____	5 defect	e equipment
____	6 effect	f the outcome or result
____	7 machinery	g substances that are turned into products
____	8 materials	h personnel; employees
____	9 methods	i a fault; a deficiency
____	10 manpower	j procedures; techniques

Lesson 3: Something's Fishy Copyright ©1996 by Coast Community College District Handout 7

Handout 7, Transparency 7

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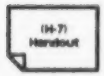
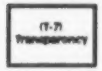
Activities

First Activity: 20 Minutes



1. **Tell** employees to work in teams to fill out their "Lesson 2 Word Power".

2. **Assist** team members from time to time, as needed.



3. **Periodically update** the master "Lesson 2 Word Power" with the correct answers as the employees work.

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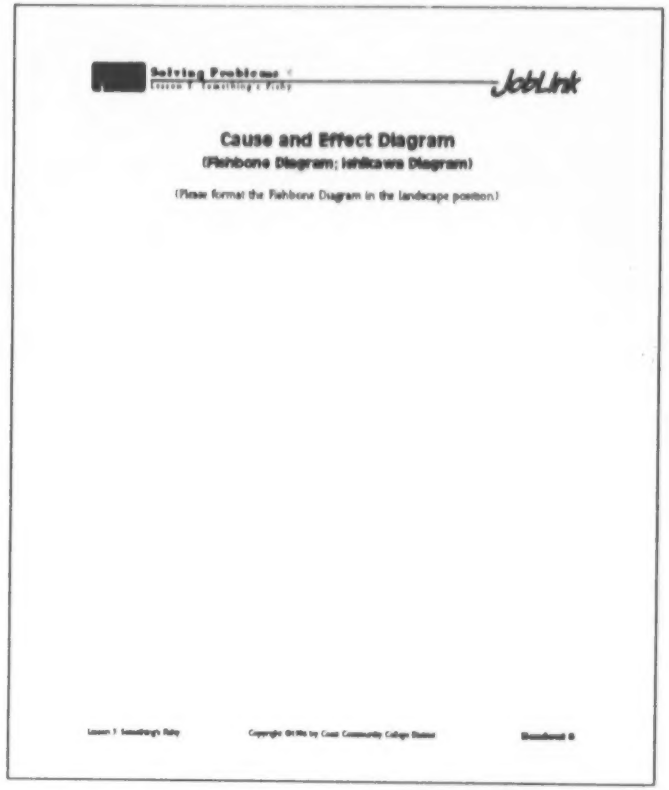

Solving Problems
JobLink

Cause and Effect Diagram
(Fishbone Diagram; Ishikawa Diagram)

(Please format the Fishbone Diagram in the landscape position.)

Handout 8, Transparency 8

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Activities

Second Activity: 45 Minutes

1. **Distribute** "Brainstorming" and **project** the transparency.

2. **Tell** employees to begin brainstorming! Encourage teams to come up with as many ideas as they can concerning the problem at EPGC.

3. **Ask** each team to designate a scribe or secretary to **write** down team members' ideas.

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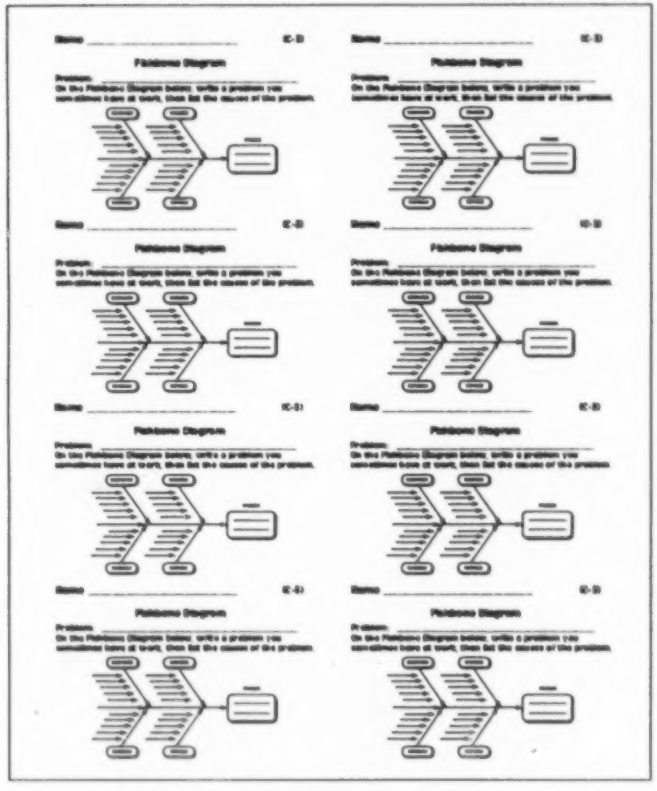
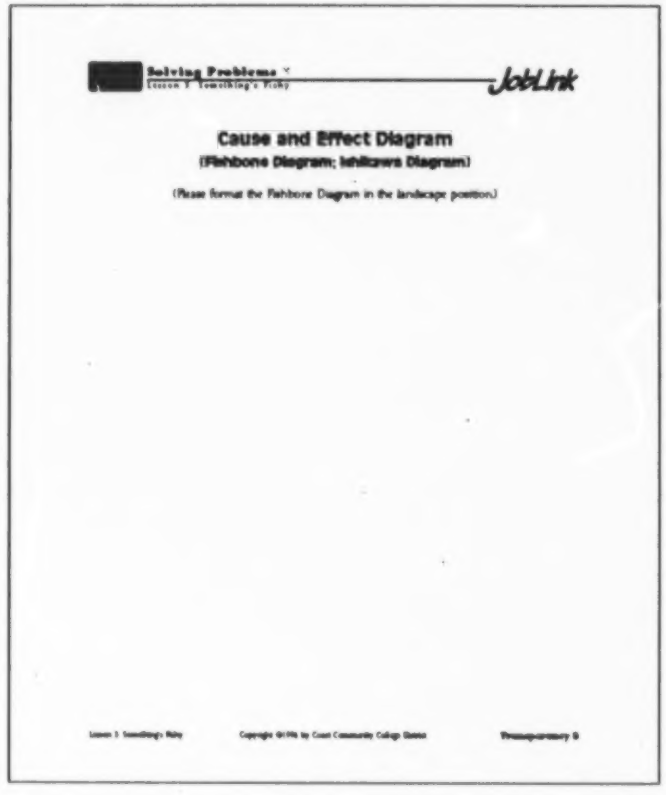


Cards 3


Solving Problems
JobLink
Cause and Effect Diagram
(Fishbone Diagram; Ishikawa Diagram)
(Please format the Fishbone Diagram in the landscape position)

Transparency 8

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Activities

Ending: 10 Minutes

1. **Fill in** the "Cause-and-Effect Diagram" with teams' input.

2. **Distribute** the "Fishbone Diagram" cards. **Instruct** employees to fill out the diagram using as their subject a problem they encounter at work.

3. **Save** work in the appropriate color folders.

4. **Say** good-bye.

S 3

S 2

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JobLink

Winning At Work

Solving Problems

Finding Solutions That Work

Lesson 4
What Needs to Be Fixed—And What Are We Going to Do About It!

Lesson Description

This lesson focuses on **Ranking Priorities** through Pareto Analysis and on Identifying Potential Causes of Problems, the third and fourth of the Six Steps of Problem Solving covered in this module.

Employees refer to the "Cause-and-Effect Diagram" that they completed during the last lesson, and then they break up into teams. In teams, they work on "Lesson 4 Word Power," and they complete the "Pareto Chart" activity and the "Identifying Potential Causes of Problems Chart."

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Objectives

By completing this lesson, employees will work in teams to:

1. **Demonstrate** comprehension of the vocabulary covered in this lesson.
2. **Rank** defects by frequency of occurrence.
3. **Choose** which defects to try to correct.
4. **Identify** possible causes of the chosen defects.

Materials Needed

Hardware

1. Overhead projector
2. Transparency markers
3. Flip chart or whiteboard
4. Whiteboard markers
5. Colored team folders from previous lesson
6. Calculators

Transparencies

"Lesson 4 Word Power" (Transparency 9)

"Tally of Defects Chart and Pareto Chart" (Transparency 10)

"Identifying Potential Causes of Problem Chart" (Transparency 11)

Materials Needed

Handouts

"Lesson 4 Word Power" (Handout 9)

"Tally of Defects Chart" (Handout 10)

"Identifying Potential Causes of Problem Chart" (Handout 11)

"Problem-Solving Techniques" cards (Card 4)

Classroom Set-up

Total Time: 90 minutes

Opening- Large Group	15 min.
First Activity- Small Groups	15 min.
Second Activity- Small Groups	20 min.
Third Activity- Small Groups	25 min.
Ending- Large Group	15 min.

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Key: Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet

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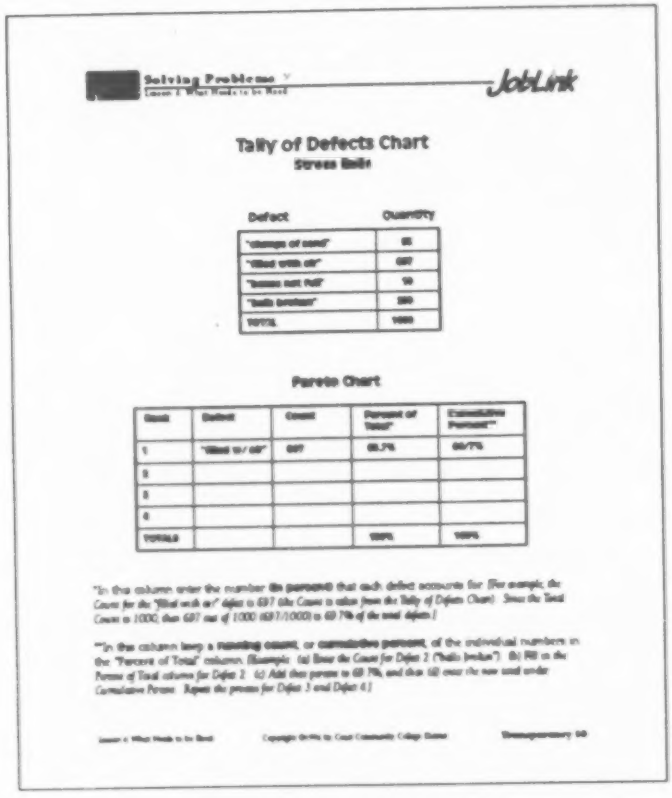

Solving Problems — JobLink

Tally of Defects Chart
Stress Ball

Defect	Quantity
"shortage of sand"	85
"filled with air"	697
"bottom not full"	59
"balls broken"	359
TOTAL	1000

Pareto Chart

Rank	Defect	Count	Percent of Total*	Cumulative Percent**
1	"filled w/ air"	697	69.7%	69.7%
2				
3				
4				
TOTALS			100%	100%

*In this column enter the number **in percent** that each defect accounts for. (For example, the Count for the "filled with air" defect is 697 (the Count is taken from the Tally of Defects Chart). Since the Total Count is 1000, then 697 out of 1000 (697/1000) is 69.7% of the total defects.)

In this column keep a **running count, or **cumulative percent**, of the individual numbers in the "Percent of Total" column. (Example: (a) Enter the Count for Defect 2 ("balls broken"). (b) Fill in the Percent of Total column for Defect 2. (c) Add then percent to 69.7%, and then (d) enter the new total under Cumulative Percent. Repeat the process for Defect 3 and Defect 4.)

Lesson 4: What Needs to Be Fixed — Copyright ©1996 by Coast Community College District — Transparency 10

Transparency 10

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Activities

Opening: 5 Minutes

1. **Have** employees sign in and wear name tags *(if necessary)*.
2. **Welcome** employees.

3. **Project** the "Tally of Defects Chart".

4. **Discuss** the "Tally of Defects." **Remind** employees to refer to the earlier "Model Problem," where the frequencies of these defects are mentioned.

5. **Explain** Pareto Analysis and how employees will apply Pareto Analysis to the "Model Problem":
   a. Employees will rank Stress Ball defects according to their frequency.
   b. Employees will use this ranking to determine which problems they should focus on solving. For example, if most of the defects can be eliminated by focusing on only two problems, the team's energy will be used most effectively by solving those two problems. **(Note:** *In real life, cost factors must also be considered. For example, it may be less expensive to reject defective parts than to change the production problem that causes the defects.)*
6. **Explain** that after they rank defects, teams will choose which defects they will try to solve. **Tell** them that they will later chart each of the chosen defects individually on the "Identifying Potential Causes of Problem Chart" *(to be handed out and explained later)*, where they will identify potential causes for each of the chosen problems.

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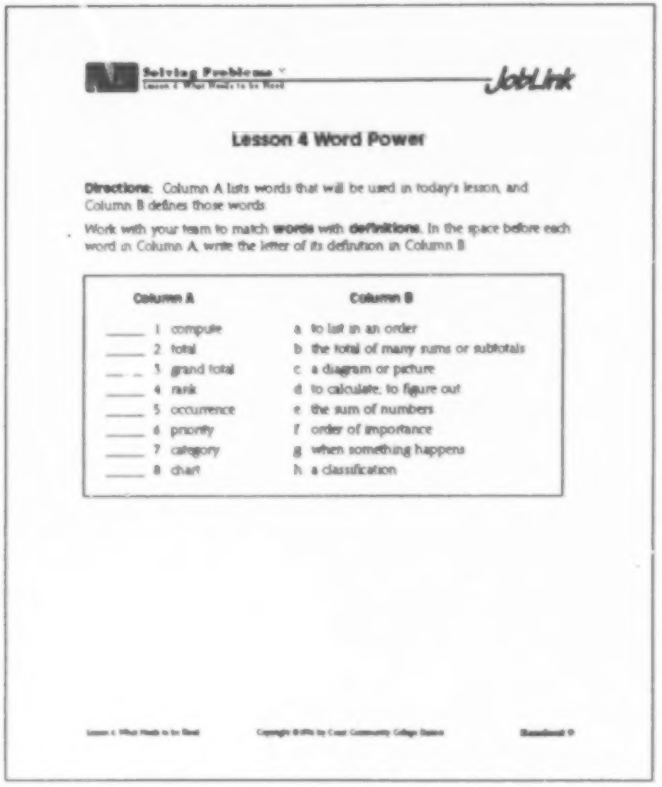

Solving Problems — JobLink

Lesson 4 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions**. In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. compute	a. to list in an order
_____ 2. total	b. the total of many sums or subtotals
_____ 3. grand total	c. a diagram or picture
_____ 4. rank	d. to calculate, to figure out
_____ 5. occurrence	e. the sum of numbers
_____ 6. priority	f. order of importance
_____ 7. category	g. when something happens
_____ 8. chart	h. a classification

Handout 9, Transparency 9

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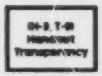
Activities

First Activity: 15 Minutes



1. **Tell** employees to work in teams to fill out their "Lesson 4 Word Power".

2. **Assist** the employees from time to time, if needed.

3. **Periodically update** the master "Lesson 4 Word Power" with the correct answers as employees work.

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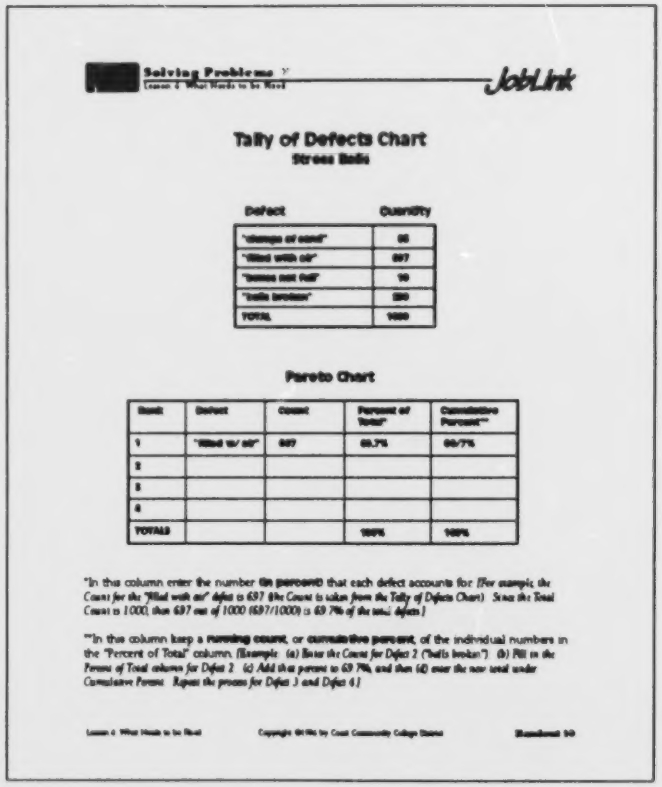

Solving Problems
JobLink

Tally of Defects Chart
Stress Balls

Defect	Quantity
"change of scent"	55
"filled with air"	697
"leaves not full"	10
"balls broken"	238
TOTAL	1000

Pareto Chart

Rank	Defect	Count	Percent of Total*	Cumulative Percent**
1	"filled w/ air"	697	69.7%	69.7%
2				
3				
4				
TOTALS			100%	100%

*In this column enter the number **in percent** that each defect accounts for. *[For example, the Count for the "filled with air" defect is 697. The Count is taken from the Tally of Defects Chart. Since the Total Count is 1000, then 697 out of 1000 (697/1000) is 69.7% of the total defects.]*

In this column keep a **running count, or **cumulative percent**, of the individual numbers in the "Percent of Total" column. *[Example: (a) Enter the Count for Defect 2 ("balls broken"). (b) Fill in the Percent of Total column for Defect 2. (c) Add that percent to 69.7%, and then (d) enter the new total under Cumulative Percent. Repeat the process for Defect 3 and Defect 4.]*

Lesson 4: What Needs to Be Fixed Copyright ©1996 by Coast Community College District Handout 10

Handout 10, Transparency 10

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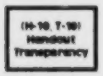
Activities

Second Activity: 20 Minutes



1. **Tell** the teams to work together to rank the defects from the "Tally of Defects Chart" onto the "Pareto Chart" at the bottom of the page. **Explain** to the teams that they are to rank defects by frequency. **Allow** them to use calculators to determine the percentage of total defects that each defect accounts for.

2. **Tell** the teams to decide which of the problems they are going to try to correct. **Explain** that the objective is to correct the few problems that are causing the most defects.

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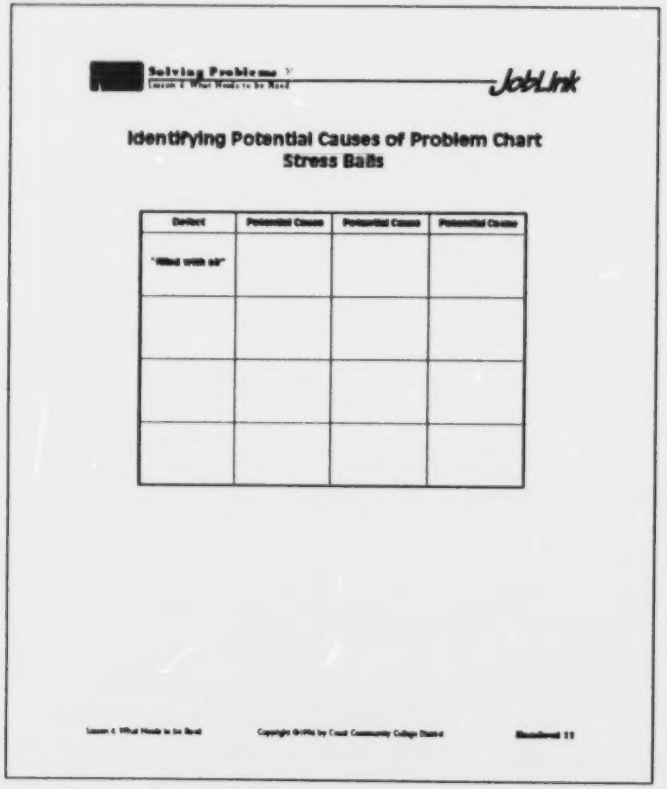

Solving Problems
JobLink

Identifying Potential Causes of Problem Chart
Stress Balls

Detect	Potential Cause	Potential Cause	Potential Cause
"filled with air"			

Lesson 4: What Needs to Be Fixed Copyright ©1996 by Coast Community College District Handout 11

Handout 11

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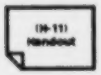
Activities

Third Activity: 25 Minutes



1. **Distribute** copies of the "Identifying Potential Causes of Problem Chart".

2. **Tell** the teams to work together to list the potential causes of each of the defects they have chosen to correct. **Allow** them to refer to all of the written aids in their folder, including the "Model Problem" and the "Cause-and-Effect Analysis."

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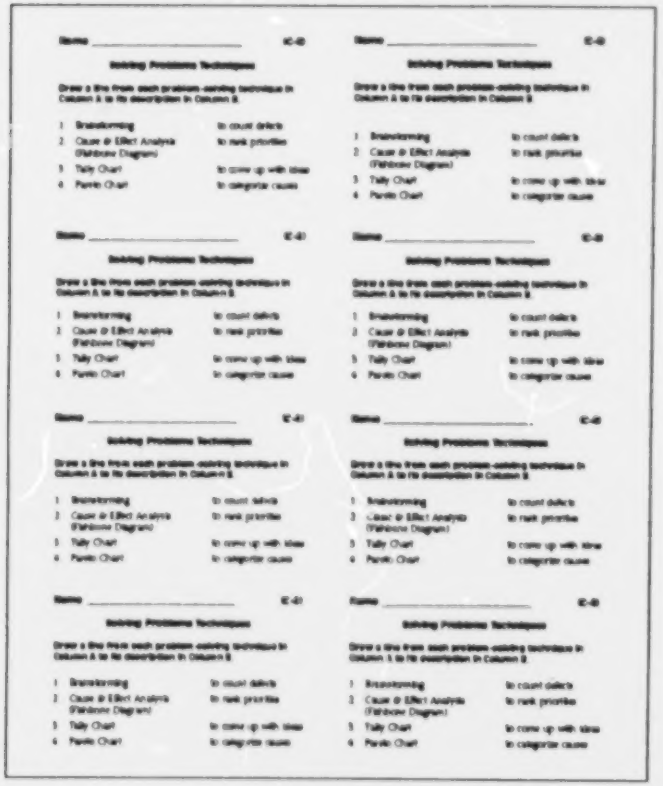
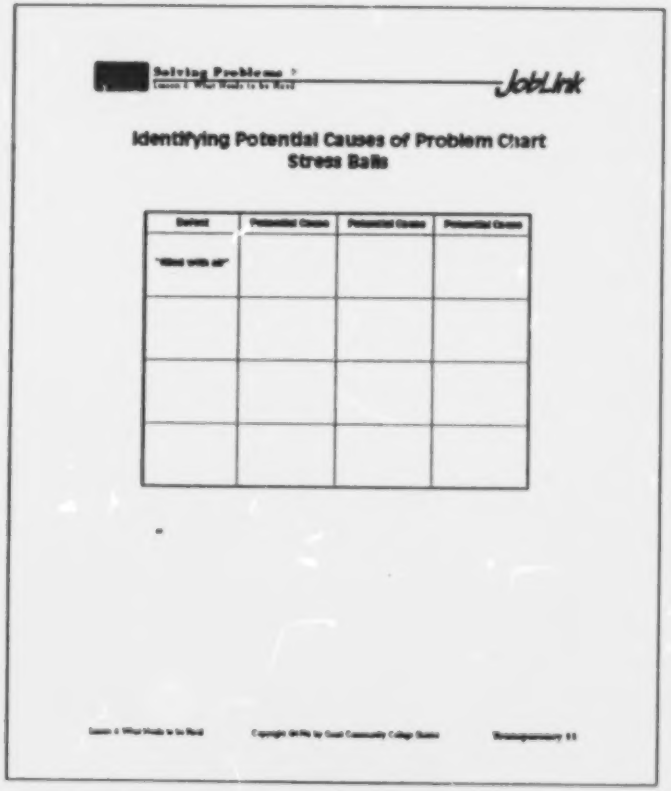


Cards 4



Transparency 11

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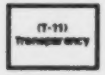
Activities

Ending: 15 Minutes



1. **Fill in** the "Identifying Potential Causes of Problem Chart" with input from the different teams.

2. **Distribute** the "Problem-Solving Techniques" cards for employees to match the steps in Problem Solving with their functions.

3. **Save** work in folders.

4. **Say** good-bye.

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Winning At Work

Solving Problems

Finding Solutions That Work

Lesson 5
Let's Fix It!

Lesson Description

This lesson focuses on **Designing a Corrective Action Plan and on Presenting Solutions**, the fifth and sixth of the Six Steps of Problem Solving covered in this module.

Employees refer to the "Identifying Potential Causes of Problems Chart" that they completed in the last lesson. Then, working in teams, employees work on "Lesson 5 Word Power." Still in teams, the employees develop their Corrective Action Plans, and the teams present their solutions to one another.

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Objectives

By completing this lesson, employees will work in teams to:

1. **Demonstrate** comprehension of the vocabulary covered in this lesson.
2. **Develop** a plan for correcting the most frequent defects.
3. **Present** their solutions to the other teams.

Materials Needed

Hardware

1. Overhead projector
2. Transparency markers
3. Flip chart or whiteboard
4. Whiteboard markers
5. Colored team folders from previous lesson

Transparencies

"Lesson 5 Word Power" (Transparency 12)
"Corrective Action Plan" (Transparency 13)

Materials Needed

Handouts

"Lesson 5 Word Power" (Handout 12)
"Corrective Action Plan" (Handout 13)
"Making Suggestions and Recommendations" cards (Card 5)

Classroom Set-up

Total Time: 90 minutes

Opening- Large Group	10 min.
First Activity- Small Groups	20 min.
Second Activity- Small Groups	45 min.
Ending- Large Group	15 min.

Key Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet

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Activities

Opening: 10 Minutes

1. **Have** employees sign in and wear name tags *(if necessary)*.
2. **Welcome** employees.

3. **Explain** that employees will work in teams: First, the teams will work on completing "Lesson 5 Word Power"; then they will work on developing a "Corrective Action Plan" and presenting the plan to the rest of the class.

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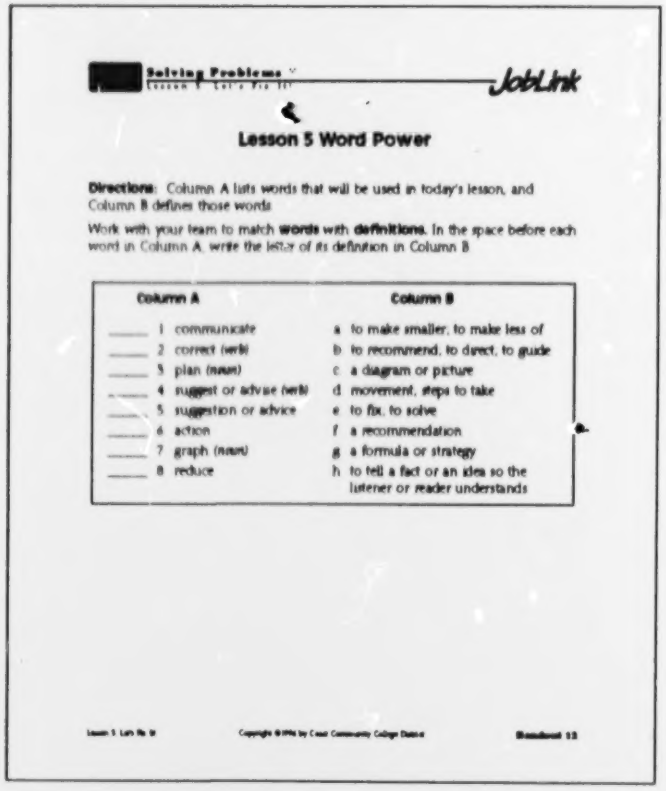

Solving Problems
Lesson 5: Let's Fix It!
JobLink

Lesson 5 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1 communicate	a to make smaller; to make less of
_____ 2 correct (verb)	b to recommend; to direct; to guide
_____ 3 plan (*noun*)	c a diagram or picture
_____ 4 suggest or advise (verb)	d movement; steps to take
_____ 5 suggestion or advice	e to fix; to solve
_____ 6 action	f a recommendation
_____ 7 graph (*noun*)	g a formula or strategy
_____ 8 reduce	h to tell a fact or an idea so the listener or reader understands

Lesson 5: Let's Fix It! Copyright ©1996 by Coast Community College District Handout 12

Handout 12, Transparency 12

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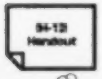
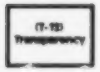
Activities

First Activity: 20 Minutes



1. **Ask** employees to break into teams and to complete their "Lesson 5 Word Power".

2. **Assist** the employees from time to time, if needed.



3. **Periodically update** the master "Lesson 5 Word Power" with the correct answers as the employees work.

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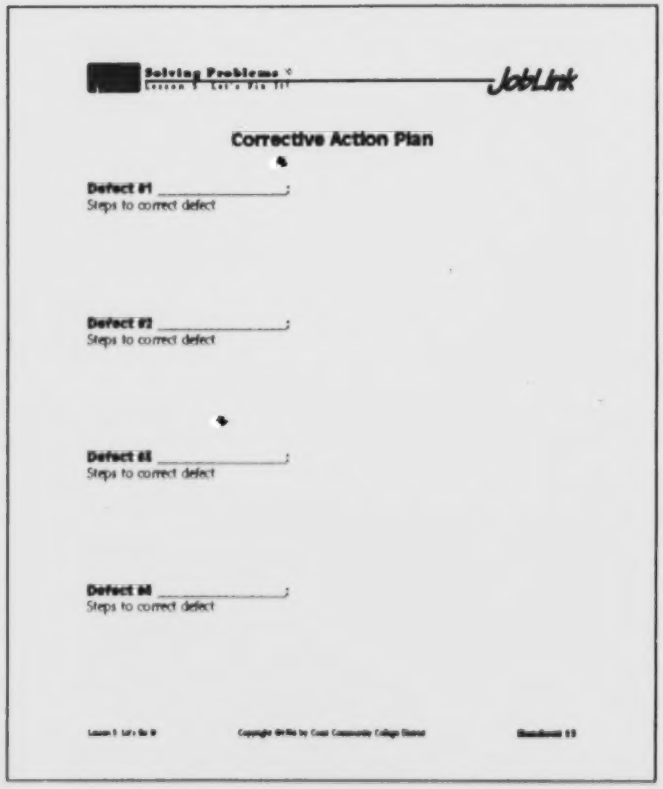
Solving Problems
JobLink

Corrective Action Plan

Defect #1 _____;
Steps to correct defect

Defect #2 _____;
Steps to correct defect

Defect #3 _____;
Steps to correct defect

Defect #4 _____;
Steps to correct defect

Handout 13, Transparency 13

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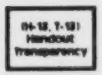
Activities

Second Activity: 45 Minutes



1. **Instruct** the teams to work together to develop a "Corrective Action Plan". **Explain** that they are to fill in the "Steps to correct defect:" in the chart.

2. **Guide** each team to work together on its presentation of the Corrective Action Plan to the class.

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Activities

Ending: 10 Minutes

1. **Coordinate** the teams' Corrective Action Plan presentations to the class.

2. **Tell** the class that for the final lesson, teams will be given a problem developed by their supervisors. **Explain** that they are to use the Six Steps for Problem Solving to analyze the problem, develop an action plan, and present the plan to the class.

3. **Say** good-bye.

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Winning At Work

Solving Problems

Finding Solutions That Work

Lesson 6
Welcome to the Real World!

123

Lesson Description

This lesson focuses on **solving a real problem**–either a problem that supervisors developed in the Supervisor Module or a problem chosen by each team.

To solve this problem, the employees work in teams. As they work, employees utilize all of the Six Steps of Problem Solving covered in the first five lessons.

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Objectives

By completing this lesson, employees will work in teams to:

1. **Use** the Six Steps of Problem Solving to solve a real problem.
2. **Present** their team's solution to the other teams.

Materials Needed

Hardware

1. Overhead projector
2. Transparency markers
3. Flip chart or whiteboard
4. Whiteboard markers
5. Colored team folders from previous lesson

Transparencies

"Module Preview" (Transparency 1)

"The Real Problem" (Transparency 14), *if supervisors provide the problem*

"Brainstorming the Real Problem" (Transparency 15)

"Cause-and-Effect Diagram" (Transparency 8)

"Tally of Defects Chart" (Transparency 16)

"Identifying Potential Causes of Problem Chart" (Transparency 17)

"Corrective Action Plan" (Transparency 13)

"Six Steps of Problem Solving" cards (Card 6)

Materials Needed

Handouts

"The Real Problem" (Handout 14), *if supervisors provide the problem*

"Brainstorming the Real Problem" (Handout 15)

"Cause-and-Effect Diagram" (Handout 8)

"Tally of Defects Chart" (Handout 16)

"Identifying Potential Causes of Problem Chart" (Handout 17)

"Corrective Action Plan" (Handout 13)

"Six Steps of Problem Solving" cards (Card 6)

Classroom Set-up

Total Time: 90 minutes

Opening- Large Group	10 min.
First Activity- Small Groups	60 min.
Ending- Large Group	20 min.

Key Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet

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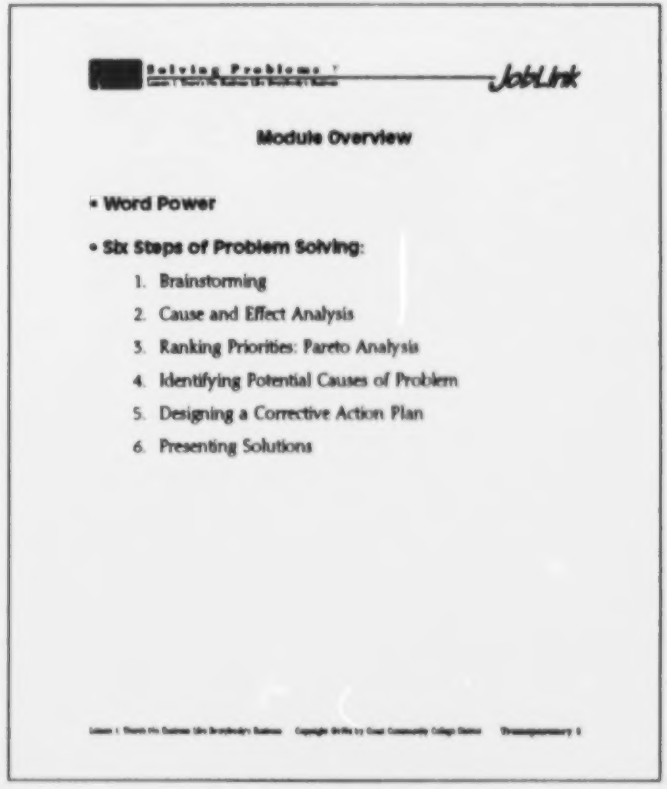
Handout 14, Transparency 14



Transparency 1

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Activities

Opening: 10 Minutes

(T-1) Transparency

1. **Project** the "Module Overview" and **review** the Six Steps of Problem Solving.

(H-14, T-14) Handout Transparency

2. **Explain** that teams will be working on a real problem *(either one chosen by their supervisors or one chosen by each team)* and that employees will be following the Six Steps of Problem Solving as they work through this problem.

3. **Read** the presentation of the problem together with the class.

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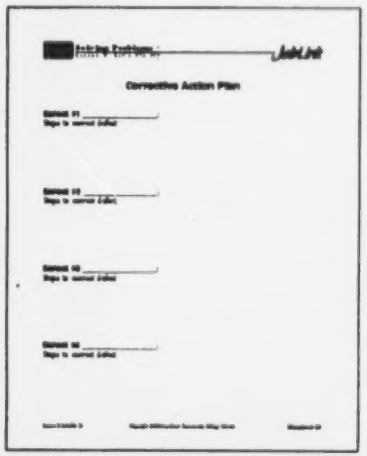
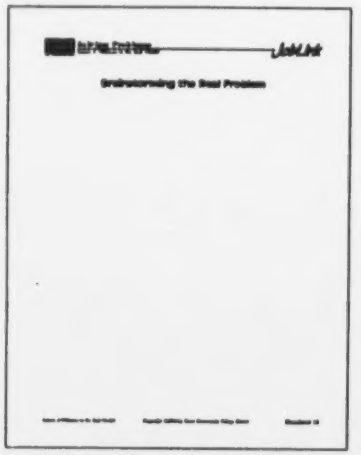
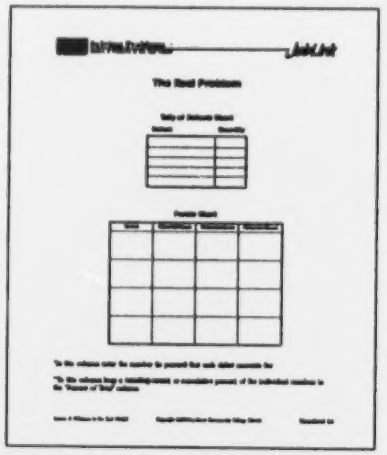


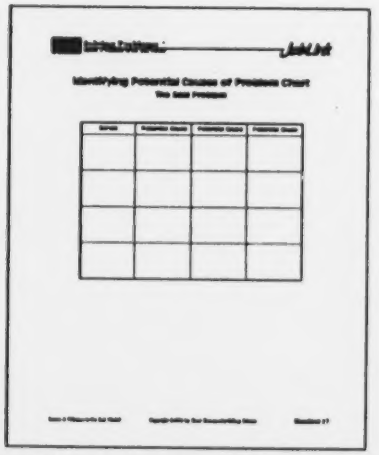
Handout 13- Transparency 13



Handout 15- Transparency 15



Handout 16- Transparency 16



Handout 17- Transparency 17

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Activities

First Activity: 60 Minutes

1. **Tell** teams to work together to solve the problem. *(The worksheets they use are the same or similar to the ones they used to solve the Model Problem.)*

04-18, T-18 Handout Transparency | 04-19, T-19 Handout Transparency | 04-18, T-18 Handout Transparency | 04-17, T-17 Handout Transparency

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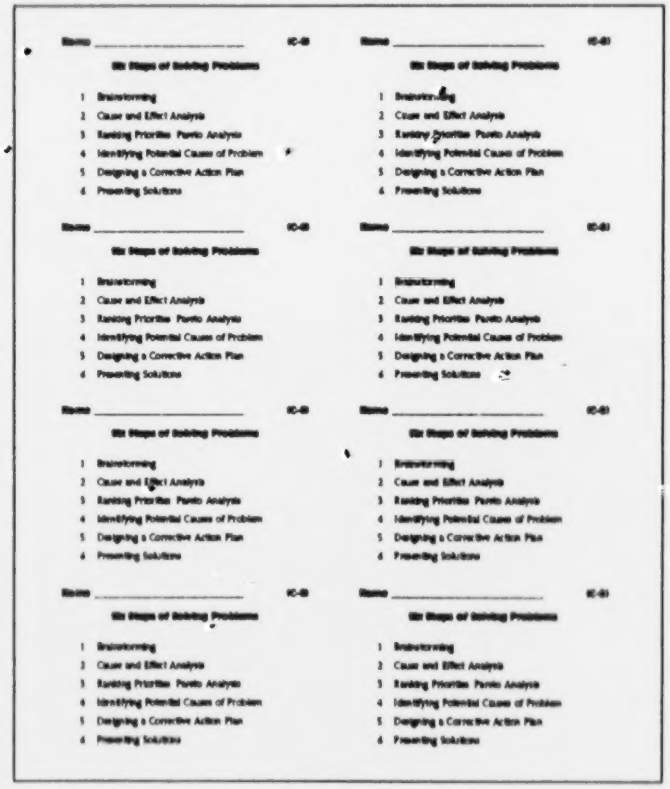

Name _____ IC-6

Six Steps of Solving Problems

1. Brainstorming
2. Cause and Effect Analysis
3. Ranking Priorities: Pareto Analysis
4. Identifying Potential Causes of Problem
5. Designing a Corrective Action Plan
6. Presenting Solutions

Cards 6

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Activities

Ending: 20 Minutes

1. **Ask** teams to present their "Corrective Action Plan" to the class.

2. **Distribute** "Six Steps of Problem Solving".
3. **Say** good-bye.

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Name Answer Key Date _____

Pretest/Posttest

On the blank line, write the letter of the correct answer.

b 1. Brainstorming is used to:
   a) Get rid of bad ideas.
   b) Generate as many ideas as possible.
   c) Find out who is not smart.

b 2. Which of the following is not one of the 4 Ms?
   a) Machines
   b) Management
   c) Materials

C 4. What is "ranking"?
   a) Writing in a log
   b) Making rules
   c) Making a list in order of priority

a 5. When problem-solving, it is a good idea to:
   a) Look at all the problems before deciding which ones to correct.
   b) Work on the first problem you find.
   c) Work on the easy problems first.

How well do you agree or disagree with the questions below? Using the following scale, **circle** the number that best represents your answer:

1 "Strongly agree"	2 "Agree"	3 "Disagree"	4 "Strongly disagree"

5. I feel comfortable solving problems at work.
   1 2 3 4
6. I know how to organize the causes of a problem
   1 2 3 4
7. I know how to decide which problem to work on first.
   1 2 3 4
8. I know how to use the six steps of problem solving.
   1 2 3 4
9. I consider everyone's ideas when I'm trying to solve a problem.
   1 2 3 4
10. I organize the information I get to help me figure out a cause and effect of the problem I am working on.
   1 2 3 4
11. I use ranking to determine which problems are important to correct.
   1 2 3 4
12. I develop a corrective action plan when solving problems.
   1 2 3 4

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Name _____ Date _____

Pretest/Posttest

On the blank line, write the letter of the correct answer.

___ 1. Brainstorming is used to:
a) Get rid of bad ideas.
b) Generate as many ideas as possible.
c) Find out who is not smart.

___ 2. Which of the following is not one of the 4 Ms?
a) Machines
b) Management
c) Materials

___ 4. What is "ranking"?
a) Writing in a log
b) Making rules
c) Making a list in order of priority

___ 5. When problem-solving, it is a good idea to:
a) Look at all the problems before deciding which ones to correct.
b) Work on the first problem you find.
c) Work on the easy problems first.

How well do you agree or disagree with the questions below? Using the following scale, **circle** the number that best represents your answer:

1 "Strongly agree"	2 "Agree"	3 "Disagree"	4 "Strongly disagree"

5. I feel comfortable solving problems at work.
1 2 3 4
6. I know how to organize the causes of a problem
1 2 3 4
7. I know how to decide which problem to work on first.
1 2 3 4
8. I know how to use the six steps of problem solving.
1 2 3 4
9. I consider everyone's ideas when I'm trying to solve a problem.
1 2 3 4
10. I organize the information I get to help me figure out a cause and effect of the problem I am working on.
1 2 3 4
11. I use ranking to determine which problems are important to correct.
1 2 3 4
12. I develop a corrective action plan when solving problems.
1 2 3 4

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Your instructor will complete these questions

A. Course Number _____ Instructor _____
Site Location _____ Class Schedule _____
Module _____

B. Who completed this form? **(MARK ONE BOX)**

- ❑ The learner
- ❑ The learner, with assistance from instructor or project staff
- ❑ An instructor or project staff member with information provided by the learner
- ❑ Other (Please specify)

_____

C. Date form completed: ___/___/___

1. Name: _____

2. Address: _____

_____

3. Phone Number: ( ) _____

4. Social Security Number:

_____-_____-_____

5. In the future, do you plan to take any of the following courses?

(Mark one for each line)

	Plan to Take	Do Not Plan to Take
A basic skills course in reading, writing, or math	❑	❑
A course in using English (such as ESL)	❑	❑
A computer course	❑	❑
A GED course or the GED exam	❑	❑
Courses to get an occupational certificate	❑	❑
A job training course	❑	❑
Courses leading to a 2-year or 4-year college degree	❑	❑
A home-study course	❑	❑

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6. Since this course began, have you:

(Mark one for each line)

	YES	NO
Learned what you wanted to learn in this course?	❑	❑
Changed your educational or career goals?	❑	❑
Had more responsibility added to your job?	❑	❑
Moved to a shift you prefer?	❑	❑
Switched from part-time to full-time?	❑	❑
Received a pay raise?	❑	❑
Been promoted?	❑	❑
Received an award, bonus, or other special recognition on your job?	❑	❑
Received your GED?	❑	❑
Applied for a new job?	❑	❑
Started a new job at another company?	❑	❑
Been laid off?	❑	❑
Left your job for any other reason? (Please Specify)	❑	❑

_____

7. Please rate your ability to perform each of the following activities.

(Please mark one response for every activity)

	Poor	Fair	Good	Excellent
Read English	❑	❑	❑	❑
Understand English	❑	❑	❑	❑
Speak English	❑	❑	❑	❑
Write in English	❑	❑	❑	❑
Work as part of a team	❑	❑	❑	❑
Use math	❑	❑	❑	❑
Solve problems/use reasoning	❑	❑	❑	❑

Thank you. You have completed this form.
Please return it to your instructor.

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Instructor _____
Class Schedule _____
Module _____

Your instructor will complete these questions

A. Course Number _____
Site Location _____

B. Who completed this form?
(MARK ONE BOX)

- ❑ The learner
- ❑ The learner, with assistance from instructor or project staff
- ❑ An instructor or project staff member with information provided by the learner
- ❑ Other (Please specify)

_____
_____

C. Date form completed: ___/___/___

1. **Name:** _____

2. **Address:** _____

_____

3. **Phone Number:** ( ) _____

4. **Social Security Number:**

_____-_____-_____

5. **Age:** _____

6. **Were you born in the United States?**
❑ Yes ❑ No

7. **Sex:** ❑ Male ❑ Female

8. **Race: (Mark One Box)**
- ❑ White
- ❑ Black (African American)
- ❑ Asian or Pacific Islander
- ❑ American Indian or Alaskan Native
- ❑ Hispanic
- ❑ Other (Please specify):

_____

9. **Is English the language that is spoken most often in your home?**
❑ Yes ❑ No

10. **How many years of school have you completed?** _____

Of these, how many in the U.S.? _____
In any other country? _____

11. **Are you a union member?**
- ❑ Yes- What is the name of your union?

_____

- ❑ No

12. **Please rate your ability to perform each of the following activities.**

(Please mark one response for every activity)

	Poor	Fair	Good	Excellent
Read English	❑	❑	❑	❑
Understand English	❑	❑	❑	❑
Speak English	❑	❑	❑	❑
Write in English	❑	❑	❑	❑
Work as part of a team	❑	❑	❑	❑
Use math	❑	❑	❑	❑
Solve problems/use reasoning	❑	❑	❑	❑

13. **Do you have a job?**
- ❑ Yes, employed
- ❑ Yes, on temporary layoff

- ❑ No, retired
- ❑ No, not employed

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Thank you. You have completed this form. Please return it to your instructor.

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Please answer questions 14-18 for the job that allows you to take this course.

14. Name of company or employer:

_____

15. Job Title:

_____

16. On average, how many hours per week do you work on this job?

_____- _____ Hours per week

17. How much do you earn at this job?
(Write amount and mark one box)

$_____❑ Per hour ❑ Per year

18. Do you get any of the following benefits at this job?

(Mark one for each line)

	Yes	No
Paid vacation	❑	❑
Paid sick leave	❑	❑
Paid holidays	❑	❑
Health insurance	❑	❑

19. How long have you worked at this job?

_____ -_____ and _____-_____
years months

20. At your job, do you need to do any of the following?

(Mark one for each line)

	Yes	No
Read instructions	❑	❑
Receive spoken instructions in English	❑	❑
Speak English	❑	❑
Work as part of a team	❑	❑
Write in English	❑	❑
Use math	❑	❑
Solve problems/use reasoning	❑	❑

21. Do you work at more than one job?

❑ Yes ❑ No

Thank you. You have completed this form. Please return it to your instructor.

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Module Overview

- **Word Power**
- **Six Steps of Problem Solving:**
    1. Brainstorming
    2. Cause and Effect Analysis
    3. Ranking Priorities: Pareto Analysis
    4. Identifying Potential Causes of Problem
    5. Designing a Corrective Action Plan
    6. Presenting Solutions

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Lesson 1 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____1. produce	a. substance used to make a product
_____2. quality	b. procedure; method; steps involved
_____3. process	c. to make
_____4. product	d. energy that is used to push or force
_____5. profitable	e. money-making
_____6. pressure	f. a produced or manufactured item
_____7. defect	g. the condition of a product (good or bad)
_____8. material	h. imperfection; fault

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Model Problem: Stress Balls at EPGC

Employee Module

Welcome to the Expert Puzzle and Game Corporation (EPGC)! EPGC is in northern Maine. It produces games and puzzles. EPGC distributes its puzzles and games in the United States. The company produces quality products.

There are product developers at EPGC. They take pride in their work. They design games and puzzles. They make money by inventing new games and puzzles for their company to produce.

Candace and Rick are two product developers. They think up new games and puzzles. They try out their ideas on each other. They are always competing with each other. They like to see whose ideas will make the most money for their company. They each try to come up with as many new ideas as possible.

EPGC has a warehouse. Employees in Receiving check the material and parts that come into the plant. The warehouse stores all these materials and parts. It is separate from the main building.

Employees carry the material and parts that they need for production from the warehouse to the main building. Joe is the employee who goes to the warehouse for materials and parts. He brings them to the main building. During the winter, he often has to put on boots and a heavy coat to go over to the warehouse.

This is an assembly line that produces word games. Inspectors check the games when they come off the assembly line. Marta is in charge of quality control. She is very good at finding defects.

Packers pack the games into boxes. Other employees move them to the warehouse.

In the warehouse, forklifts carry tall stacks of games. The puzzles and games are not breakable. Forklift operators can stack the games very high. Emily and Anthony are two of the forklift operators in the warehouse.

Six months ago, EPGC designed a new product. It quickly became very popular and profitable. The new product is the Stress Ball. Unlike the other EPGC products, the Stress Ball is not a puzzle or a game. Its assembly is very simple. Four people work one day a week to produce enough Stress Balls to meet EPGC's weekly quota.

(continued on back)

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Model Problem: Stress Balls at EPGC
(continued)

The Stress Ball is a strong balloon that is pressure-filled with sand. Each of the four employees is responsible for one part of the manufacturing process.

One employee brings the sand and balloons from the storage room. He or she is in charge of filling the injection machine with sand.

Another employee fits 24 balloons over the filling tubes.

When the balloons are over the tubes, the third employee pulls a handle. The pulling causes the machine to use pressure to push sand into the balloons.

After the balloons are full, all four employees work together to remove the balloons from the filling tubes. They squeeze out air and tie a knot in each balloon.

A fourth employee inspects the Stress Balls and packs them into cartons for shipping.

The company manufactures Stress Balls only one day a week. Management takes four employees away from their usual jobs to make Stress Balls. Three employees are Rick from Product Development, Marta from Quality Control, and Joe from the Storage Department. The company chooses a different employee each week to take the fourth position.

Marta gets the material and fills the injection machine with sand. Joe pulls the fill handle. Rick and the fourth worker take turns placing the balloons over the tubes. They also inspect the completed Stress Balls.

At first, there were no problems in the Stress Ball department. However, lately EPGC has been receiving many customer complaints.

There are many different complaints. Some Stress Balls have large lumps of sand in them. Others have air in them. Some packed boxes of Stress Balls are missing one or two balls. Some boxes of Stress Balls have broken balls inside.

These problems are costing EPGC profits. They are hurting EPGC's reputation as a company that produces quality products.

You are going to solve EPGC's problem!

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Organize the Details: Stress Balls at EPGC

Directions: After you read the "Model Problem," work with your team to fill in the information below:

A. List all the people mentioned in the "Model Problem" and the jobs they do.
(Hint: One person is not mentioned by name.)

	Person	Job
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____

B. What are the steps in making Stress Balls?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

C. What machine is used to make Stress Balls?

_____

D. What materials are used to make Stress Balls?

1. _____ 2. _____

E. What are the customer complaints about Stress Balls?

1. _____ 3. _____
2. _____ 4. _____

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Lesson 2 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. brainstorm	a. to find an answer to a problem
_____ 2. idea	b. open to new ideas
_____ 3. opinion	c. the answer to a problem
_____ 4. to judge	d. to form an opinion about something
_____ 5. judgment	e. a thought
_____ 6. to solve	f. a decision made after judging
_____ 7. open-minded	g. a belief not always based on facts
_____ 8. solution	h. to work as a group to come up with as many ideas as possible without judging the ideas or the group members

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Brainstorming

PROBLEM: EPGC's customers are complaining about the quality of Stress Balls. The company is losing profits. The company's reputation is suffering.

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Lesson 3 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. diagram	a. reason
_____ 2. analysis	b. people who receive products or services
_____ 3. cause	c. a picture or drawing
_____ 4. customer	d. an examination; an investigation
_____ 5. defect	e. equipment
_____ 6. effect	f. the outcome or result
_____ 7. machinery	g. substances that are turned into products
_____ 8. materials	h. personnel, employees
_____ 9. methods	i. a fault; a deficiency
_____ 10. manpower	j. procedures; techniques

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Cause and Effect Diagram
(Fishbone Diagram; Ishikawa Diagram)

(Please format the Fishbone Diagram in the landscape position.)

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Lesson 4 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. compute	a. to list in an order
_____ 2. total	b. the total of many sums or subtotals
_____ 3. grand total	c. a diagram or picture
_____ 4. rank	d. to calculate; to figure out
_____ 5. occurrence	e. the sum of numbers
_____ 6. priority	f. order of importance
_____ 7. category	g. when something happens
_____ 8. chart	h. a classification

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Tally of Defects Chart
Stress Balls

Defect	Quantity
"clumps of sand"	93
"filled with air"	697
"boxes not full"	10
"balls broken"	200
TOTAL	1000

Pareto Chart

Rank	Defect	Count	Percent of Total*	Cumulative Percent**
1	"filled w/ air"	697	69.7%	69/7%
2				
3				
4				
TOTALS			100%	100%

*In this column enter the number **(in percent)** that each defect accounts for. *[For example, the Count for the "filled with air" defect is 697 (the Count is taken from the Tally of Defects Chart). Since the Total Count is 1000, then 697 out of 1000 (697/1000) is 69.7% of the total defects.]*

In this column keep a **running count, or **cumulative percent**, of the individual numbers in the "Percent of Total" column. *[Example: (a) Enter the Count for Defect 2 ("balls broken"). (b) Fill in the Percent of Total column for Defect 2. (c) Add that percent to 69.7%, and then (d) enter the new total under Cumulative Percent. Repeat the process for Defect 3 and Defect 4.]*

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Identifying Potential Causes of Problem Chart
Stress Balls

Defect	Potential Cause	Potential Cause	Potential Cause
"filled with air"			

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Lesson 5 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. communicate	a. to make smaller; to make less of
_____ 2. correct *(verb)*	b. to recommend; to direct; to guide
_____ 3. plan *(noun)*	c. a diagram or picture
_____ 4. suggest or advise *(verb)*	d. movement; steps to take
_____ 5. suggestion or advice	e. to fix; to solve
_____ 6. action	f. a recommendation
_____ 7. graph *(noun)*	g. a formula or strategy
_____ 8. reduce	h. to tell a fact or an idea so the listener or reader understands

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Corrective Action Plan

Defect #1 _____:
Steps to correct defect:

Defect #2 _____:
Steps to correct defect:

Defect #3 _____:
Steps to correct defect:

Defect #4 _____:
Steps to correct defect:

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The Real Problem

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Brainstorming the Real Problem

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The Real Problem

Tally of Defects Chart

Defect	Quantity

Pareto Chart

Defect	Potential Cause	Potential Cause	Potential Cause

*In this column enter the number (in percent) that each defect accounts for.

In this column keep a **running count, or cumulative percent, of the individual numbers in the "Percent of Total" column.

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Identifying Potential Causes of Problem Chart

The Real Problem

Defect	Potential Cause	Potential Cause	Potential Cause

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Name _____ (C-1)

Step-by-Step

Job _____

List the steps that you take to do your job:

1. _____
2. _____
3. _____
4. _____
5. _____

Name _____ (C-1)

Step-by-Step

Job _____

List the steps that you take to do your job:

1. _____
2. _____
3. _____
4. _____
5. _____

Name _____ (C-1)

Step-by-Step

Job _____

List the steps that you take to do your job:

1. _____
2. _____
3. _____
4. _____
5. _____

Name _____ (C-1)

Step-by-Step

Job _____

List the steps that you take to do your job:

1. _____
2. _____
3. _____
4. _____
5. _____

Name _____ (C-1)

Step-by-Step

Job _____

List the steps that you take to do your job:

1. _____
2. _____
3. _____
4. _____
5. _____

Name _____ (C-1)

Step-by-Step

Job _____

List the steps that you take to do your job:

1. _____
2. _____
3. _____
4. _____
5. _____

Name _____ (C-1)

Step-by-Step

Job _____

List the steps that you take to do your job:

1. _____
2. _____
3. _____
4. _____
5. _____

Name _____ (C-1)

Step-by-Step

Job _____

List the steps that you take to do your job:

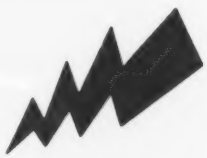
1. _____
2. _____
3. _____
4. _____
5. _____

Name _____ (C-2)

Brainstorming

Use the following words during the week while you are working. Check off each word as you use it:

1. _____ brainstorm
2. _____ opinion
3. _____ open-minded
4. _____ solution
5. _____ idea



Name _____ (C-2)

Brainstorming

Use the following words during the week while you are working. Check off each word as you use it:

1. _____ brainstorm
2. _____ opinion
3. _____ open-minded
4. _____ solution
5. _____ idea

Name _____ (C-2)

Brainstorming

Use the following words during the week while you are working. Check off each word as you use it:

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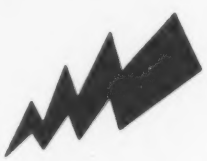

Name _____ (C-2)

Brainstorming

Use the following words during the week while you are working. Check off each word as you use it:

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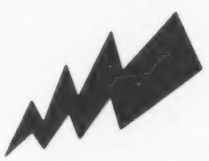
4. _____ solution
5. _____ idea



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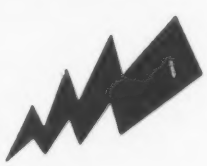

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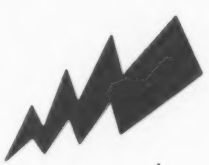

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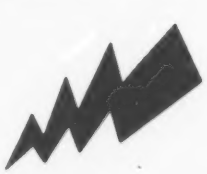

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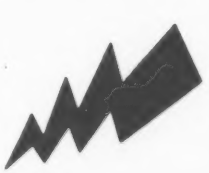
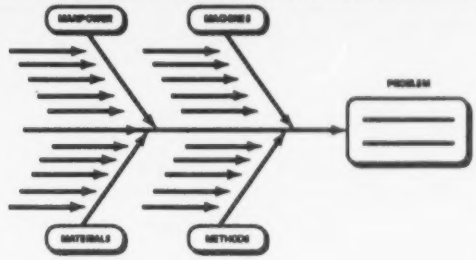


Name _____ (C-3)

Fishbone Diagram

Problem: _____

On the Fishbone Diagram below, write a problem you sometimes have at work, then list the causes of the problem.



Name _____ (C-3)

Fishbone Diagram

Problem: _____

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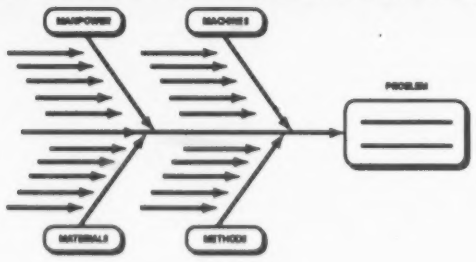

Name _____ (C-3)

Fishbone Diagram

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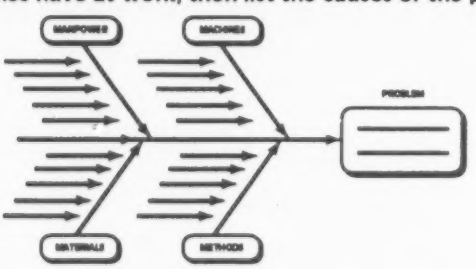

Name _____ (C-3)

Fishbone Diagram

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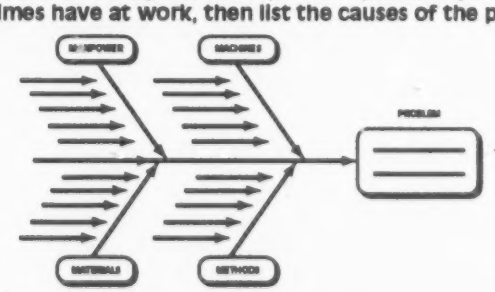

Name _____ (C-3)

Fishbone Diagram

Problem: _____

On the Fishbone Diagram below, write a problem you sometimes have at work, then list the causes of the problem.

Name _____ (C-3)

Fishbone Diagram

Problem: _____

On the Fishbone Diagram below, write a problem you sometimes have at work, then list the causes of the problem.

Name _____ (C-3)

Fishbone Diagram

Problem: _____

On the Fishbone Diagram below, write a problem you sometimes have at work, then list the causes of the problem.

Name _____ (C-3)

Fishbone Diagram

Problem: _____

On the Fishbone Diagram below, write a problem you sometimes have at work, then list the causes of the problem.

Copyright

Name _____ (C-4)

Solving Problems Techniques

Draw a line from each problem-solving technique in Column A to its description in Column B.

1. Brainstorming	to count defects
2. Cause & Effect Analysis (Fishbone Diagram)	to rank priorities
3. Tally Chart	to come up with ideas
4. Pareto Chart	to categorize causes

Name _____ (C-4)

Solving Problems Techniques

Draw a line from each problem-solving technique in Column A to its description in Column B.

1. Brainstorming — to count defects
2. Cause & Effect Analysis (Fishbone Diagram) — to rank priorities
3. Tally Chart — to come up with ideas
4. Pareto Chart — to categorize causes

Name _____ (C-4)

Solving Problems Techniques

Draw a line from each problem-solving technique in Column A to its description in Column B.

1. Brainstorming — to count defects
2. Cause & Effect Analysis (Fishbone Diagram) — to rank priorities
3. Tally Chart — to come up with ideas
4. Pareto Chart — to categorize causes

Name _____ (C-4)

Solving Problems Techniques

Draw a line from each problem-solving technique in Column A to its description in Column B.

1. Brainstorming — to count defects
2. Cause & Effect Analysis (Fishbone Diagram) — to rank priorities
3. Tally Chart — to come up with ideas
4. Pareto Chart — to categorize causes

Name _____ (C-4)

Solving Problems Techniques

Draw a line from each problem-solving technique in Column A to its description in Column B.

1. Brainstorming — to count defects
2. Cause & Effect Analysis (Fishbone Diagram) — to rank priorities
3. Tally Chart — to come up with ideas
4. Pareto Chart — to categorize causes

Name _____ (C-4)

Solving Problems Techniques

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2. Cause & Effect Analysis (Fishbone Diagram) — to rank priorities
3. Tally Chart — to come up with ideas
4. Pareto Chart — to categorize causes

Name _____ (C-4)

Solving Problems Techniques

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2. Cause & Effect Analysis (Fishbone Diagram) — to rank priorities
3. Tally Chart — to come up with ideas
4. Pareto Chart — to categorize causes

Name _____ (C-4)

Solving Problems Techniques

Draw a line from each problem-solving technique in Column A to its description in Column B.

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2. Cause & Effect Analysis (Fishbone Diagram) — to rank priorities
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Name _____ (C-4)

Solving Problems Techniques

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2. Cause & Effect Analysis (Fishbone Diagram) — to rank priorities
3. Tally Chart — to come up with ideas
4. Pareto Chart — to categorize causes

Name _____ (C-5)

Making Suggestions and Recommendations

Cross out the entries that are <u>not</u> effective when presenting solutions or suggestions:

I would like to suggest...
Our investigation has found that...
I can't believe that nobody solved this problem yet!
It might be a good idea to try...
Who was the idiot who...?
Our team recommends...
Are there any questions or suggestions?

Name _____ (C-5)

Making Suggestions and Recommendations

Cross out the entries that are <u>not</u> effective when presenting solutions or suggestions:

I would like to suggest...
Our investigation has found that...
I can't believe that nobody solved this problem yet!
It might be a good idea to try...
Who was the idiot who...?
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Are there any questions or suggestions?

Name _____ (C-5)

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Name _____ (C-5)

Making Suggestions and Recommendations

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Who was the idiot who...?
Our team recommends...
Are there any questions or suggestions?

Name _____ (C-5)

Making Suggestions and Recommendations

Cross out the entries that are <u>not</u> effective when presenting solutions or suggestions:

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Our team recommends...
Are there any questions or suggestions?

Name _____ (C-5)

Making Suggestions and Recommendations

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Name _____ (C-5)

Making Suggestions and Recommendations

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Who was the idiot who...?
Our team recommends...
Are there any questions or suggestions?

Name _____ (C-5)

Making Suggestions and Recommendations

Cross out the entries that are <u>not</u> effective when presenting solutions or suggestions:

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Our investigation has found that...
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It might be a good idea to try...
Who was the idiot who...?
Our team recommends...
Are there any questions or suggestions?

Name _____ (C-6)

Six Steps of Solving Problems

1. Brainstorming
2. Cause and Effect Analysis
3. Ranking Priorities: Pareto Analysis
4. Identifying Potential Causes of Problem
5. Designing a Corrective Action Plan
6. Presenting Solutions

Name _____ (C-6)

Six Steps of Solving Problems

1. Brainstorming
2. Cause and Effect Analysis
3. Ranking Priorities: Pareto Analysis
4. Identifying Potential Causes of Problem
5. Designing a Corrective Action Plan
6. Presenting Solutions

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Module Overview

- **Word Power**
- **Six Steps of Problem Solving:**
  1. Brainstorming
  2. Cause and Effect Analysis
  3. Ranking Priorities: Pareto Analysis
  4. Identifying Potential Causes of Problem
  5. Designing a Corrective Action Plan
  6. Presenting Solutions

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Lesson 1 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____1. produce	a. substance used to make a product
_____2. quality	b. procedure; method; steps involved
_____3. process	c. to make
_____4. product	d. energy that is used to push or force
_____5. profitable	e. money-making
_____6. pressure	f. a produced or manufactured item
_____7. defect	g. the condition of a product (good or bad)
_____8. material	h. imperfection; fault

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Model Problem: Stress Balls at EPGC

Employee Module

Welcome to the Expert Puzzle and Game Corporation (EPGC)! EPGC is in northern Maine. It produces games and puzzles. EPGC distributes its puzzles and games in the United States. The company produces quality products.

There are product developers at EPGC. They take pride in their work. They design games and puzzles. They make money by inventing new games and puzzles for their company to produce.

Candace and Rick are two product developers. They think up new games and puzzles. They try out their ideas on each other. They are always competing with each other. They like to see whose ideas will make the most money for their company. They each try to come up with as many new ideas as possible.

EPGC has a warehouse. Employees in Receiving check the material and parts that come into the plant. The warehouse stores all these materials and parts. It is separate from the main building.

Employees carry the material and parts that they need for production from the warehouse to the main building. Joe is the employee who goes to the warehouse for materials and parts. He brings them to the main building. During the winter, he often has to put on boots and a heavy coat to go over to the warehouse.

This is an assembly line that produces word games. Inspectors check the games when they come off the assembly line. Marta is in charge of quality control. She is very good at finding defects.

Packers pack the games into boxes. Other employees move them to the warehouse.

In the warehouse, forklifts carry tall stacks of games. The puzzles and games are not breakable. Forklift operators can stack the games very high. Emily and Anthony are two of the forklift operators in the warehouse.

Six months ago, EPGC designed a new product. It quickly became very popular and profitable. The new product is the Stress Ball. Unlike the other EPGC products, the Stress Ball is not a puzzle or a game. Its assembly is very simple. Four people work one day a week to produce enough Stress Balls to meet EPGC's weekly quota.

(continued on back)

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Model Problem: Stress Balls at EPGC
(continued)

The Stress Ball is a strong balloon that is pressure-filled with sand. Each of the four employees is responsible for one part of the manufacturing process.

One employee brings the sand and balloons from the storage room. He or she is in charge of filling the injection machine with sand.

Another employee fits 24 balloons over the filling tubes.

When the balloons are over the tubes, the third employee pulls a handle. The pulling causes the machine to use pressure to push sand into the balloons.

After the balloons are full, all four employees work together to remove the balloons from the filling tubes. They squeeze out air and tie a knot in each balloon.

A fourth employee inspects the Stress Balls and packs them into cartons for shipping.

The company manufactures Stress Balls only one day a week. Management takes four employees away from their usual jobs to make Stress Balls. Three employees are Rick from Product Development, Marta from Quality Control, and Joe from the Storage Department. The company chooses a different employee each week to take the fourth position.

Marta gets the material and fills the injection machine with sand. Joe pulls the fill handle. Rick and the fourth worker take turns placing the balloons over the tubes. They also inspect the completed Stress Balls.

At first, there were no problems in the Stress Ball department. However, lately EPGC has been receiving many customer complaints.

There are many different complaints. Some Stress Balls have large lumps of sand in them. Others have air in them. Some packed boxes of Stress Balls are missing one or two balls. Some boxes of Stress Balls have broken balls inside.

These problems are costing EPGC profits. They are hurting EPGC's reputation as a company that produces quality products.

You are going to solve EPGC's problem!

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Organize the Details: Stress Balls at EPGC

Directions: After you read the "Model Problem," work with your team to fill in the information below:

A. List all the people mentioned in the "Model Problem" and the jobs they do.
(Hint: One person is not mentioned by name.)

	Person	Job
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____

B. What are the steps in making Stress Balls?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

C. What machine is used to make Stress Balls?

_____

D. What materials are used to make Stress Balls?

1. _____ 2. _____

E. What are the customer complaints about Stress Balls?

1. _____ 3. _____
2. _____ 4. _____

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Lesson 2 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. brainstorm	a. to find an answer to a problem
_____ 2. idea	b. open to new ideas
_____ 3. opinion	c. the answer to a problem
_____ 4. to judge	d. to form an opinion about something
_____ 5. judgment	e. a thought
_____ 6. to solve	f. a decision made after judging
_____ 7. open-minded	g. a belief not always based on facts
_____ 8. solution	h. to work as a group to come up with as many ideas as possible without judging the ideas or the group members

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Brainstorming

PROBLEM: EPGC's customers are complaining about the quality of Stress Balls. The company is losing profits. The company's reputation is suffering.

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Lesson 3 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. diagram	a. reason
_____ 2. analysis	b. people who receive products or services
_____ 3. cause	c. a picture or drawing
_____ 4. customer	d. an examination; an investigation
_____ 5. defect	e. equipment
_____ 6. effect	f. the outcome or result
_____ 7. machinery	g. substances that are turned into products
_____ 8. materials	h. personnel, employees
_____ 9. methods	i. a fault; a deficiency
_____ 10. manpower	j. procedures; techniques

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Cause and Effect Diagram
(Fishbone Diagram; Ishikawa Diagram)

(Please format the Fishbone Diagram in the landscape position.)

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Lesson 4 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. compute	a. to list in an order
_____ 2. total	b. the total of many sums or subtotals
_____ 3. grand total	c. a diagram or picture
_____ 4. rank	d. to calculate; to figure out
_____ 5. occurrence	e. the sum of numbers
_____ 6. priority	f. order of importance
_____ 7. category	g. when something happens
_____ 8. chart	h. a classification

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Tally of Defects Chart
Stress Balls

Defect	Quantity
"clumps of sand"	93
"filled with air"	697
"boxes not full"	10
"balls broken"	200
TOTAL	1000

Pareto Chart

Rank	Defect	Count	Percent of Total*	Cumulative Percent**
1	"filled w/ air"	697	69.7%	69/7%
2				
3				
4				
TOTALS			100%	100%

*In this column enter the number **(in percent)** that each defect accounts for. *[For example, the Count for the "filled with air" defect is 697 (the Count is taken from the Tally of Defects Chart). Since the Total Count is 1000, then 697 out of 1000 (697/1000) is 69.7% of the total defects.]*

In this column keep a **running count, or **cumulative percent**, of the individual numbers in the "Percent of Total" column. *[Example: (a) Enter the Count for Defect 2 ("balls broken"). (b) Fill in the Percent of Total column for Defect 2. (c) Add that percent to 69.7%, and then (d) enter the new total under Cumulative Percent. Repeat the process for Defect 3 and Defect 4.]*

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Identifying Potential Causes of Problem Chart
Stress Balls

Defect	Potential Cause	Potential Cause	Potential Cause
"filled with air"			

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Lesson 5 Word Power

Directions: Column A lists words that will be used in today's lesson, and Column B defines those words.

Work with your team to match **words** with **definitions.** In the space before each word in Column A, write the letter of its definition in Column B.

Column A	Column B
_____ 1. communicate	a. to make smaller; to make less of
_____ 2. correct *(verb)*	b. to recommend; to direct; to guide
_____ 3. plan *(noun)*	c. a diagram or picture
_____ 4. suggest or advise *(verb)*	d. movement; steps to take
_____ 5. suggestion or advice	e. to fix; to solve
_____ 6. action	f. a recommendation
_____ 7. graph *(noun)*	g. a formula or strategy
_____ 8. reduce	h. to tell a fact or an idea so the listener or reader understands

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Corrective Action Plan

Defect #1 _____:
Steps to correct defect:

Defect #2 _____:
Steps to correct defect:

Defect #3 _____:
Steps to correct defect:

Defect #4 _____:
Steps to correct defect:

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The Real Problem

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Brainstorming the Real Problem

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The Real Problem

Tally of Defects Chart

Defect	Quantity

Pareto Chart

Defect	Potential Cause	Potential Cause	Potential Cause

*In this column enter the number (in percent) that each defect accounts for.

In this column keep a **running count, or cumulative percent, of the individual numbers in the "Percent of Total" column.

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Identifying Potential Causes of Problem Chart

The Real Problem

Defect	Potential Cause	Potential Cause	Potential Cause

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JobLink

Winning At Work

Solving Problems

Supervisor— Finding Solutions That Work

Table of Contents

Supervisor Lesson 1: 5–19

Supervisor Lesson 2: 21–28

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An Introduction

First Hour:

Supervisors receive a brief introduction to the Problem Solving steps, and they solve the "Model Problem." Then they employ the strategies they learned in the "Model Problem" to develop a real problem, one for employees to solve in Lesson 6 of the Employee Module.

Second Hour:

The supervisors problem-solve the real problem they developed for the employees. They also review and critique the employees' solutions and compare their solutions with those of the employee Module.

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JobLink

Winning At Work

Solving Problems

Finding Solutions That Work

Supervisor Lesson 1

Lesson Description

There are many different Problem Solving models. Many of them contain the components presented in this module. It is important to point out to supervisors that Problem Solving models differ from company to company and that the steps covered in this module may not exactly parallel the steps used by their company.

First Hour:

Supervisors receive a brief introduction to the Problem Solving steps, and they solve the "Model Problem." Then they employ the strategies they learned in the "Model Problem" to develop a real problem, one for employees to solve in Lesson 6 of the Employee Module.

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Objectives

By completing this lesson, supervisors will be able to:

1. **Use** Problem Solving steps to solve the "Model Problem."
2. **Develop** "The Real Problem" for Lesson 6 of the Employee Module.
3. **Evaluate** solutions they develop as well as those developed by employee teams.

Materials Needed

Hardware

1. Overhead projector
2. Transparency markers
3. Flip chart or whiteboard
4. Whiteboard markers
5. A folder for "The Real Problem"
6. "Model Problem" audiotape with accompanying pictures
7. Stress Balls (or pictures of Stress Balls)

Materials Needed

Transparencies

"Module Overview" (Supervisor Trans. 1)
"Model Problem: Stress Balls at EPGC" (Supervisor Transparency 2)
"Brainstorming" (Supervisor Trans. 3
"The Real Problem" (Supervisor Trans. 4)
"Cause and Effect Diagram" (Sup. Trans. 5)
"Tally of Defects" (Supervisor Trans. 6)
"Identifying Potential Causes of Problem Chart" (Supervisor Transparency 7)
"Corrective Action Plan" (Sup. Trans. 8)
"Summary of Plans" (Sup. Trans. 9)

Materials Needed

Handouts

"Model Problem: Stress Balls at EPGC" (Supervisor Handout 1)
"Brainstorming" (Supervisor Handout 2)
"The Real Problem" (Supervisor Handout 3)

Materials Needed

Handouts (cont'd)

"Cause and Effect Diagram" (Sup. Handout 4)
"Tally of Defects" (Supervisor Handout 5)
"Identifying Potential Causes of Problem Chart" (Supervisor Handout 6)
"Corrective Action Plan" (Sup. Handout 7)
"Six Steps of Problem Solving" cards (Sup. Handout 8)
"Summary of Plans" (Sup. Handout 9)

Classroom Set-up

Total Time: 60 minutes

First Hour

Opening- Large Group	5 min.
First Activity- Small Groups	25 min.
Second Activity- Large Group	25 min.
Ending- Large Group	5 min.

Key Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet

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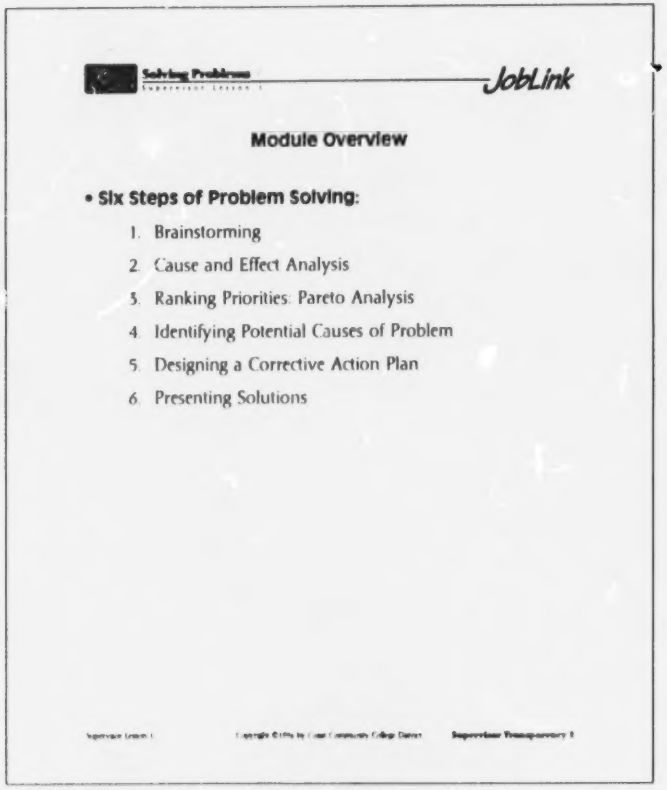

Supervisor Transparency 1

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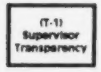
Activities

Opening: 5 Minutes

1. **Have** supervisors sign in and wear name tags *(if necessary)*.
2. **Welcome** supervisors.



3. **Project** the "Module Overview".
4. **Ask** supervisors if they have any Problem Solving experience.

5. **Introduce** content of module. Use this time to give the supervisors a general introduction to team Problem Solving. *(Refer to the Trainer Notes.)*

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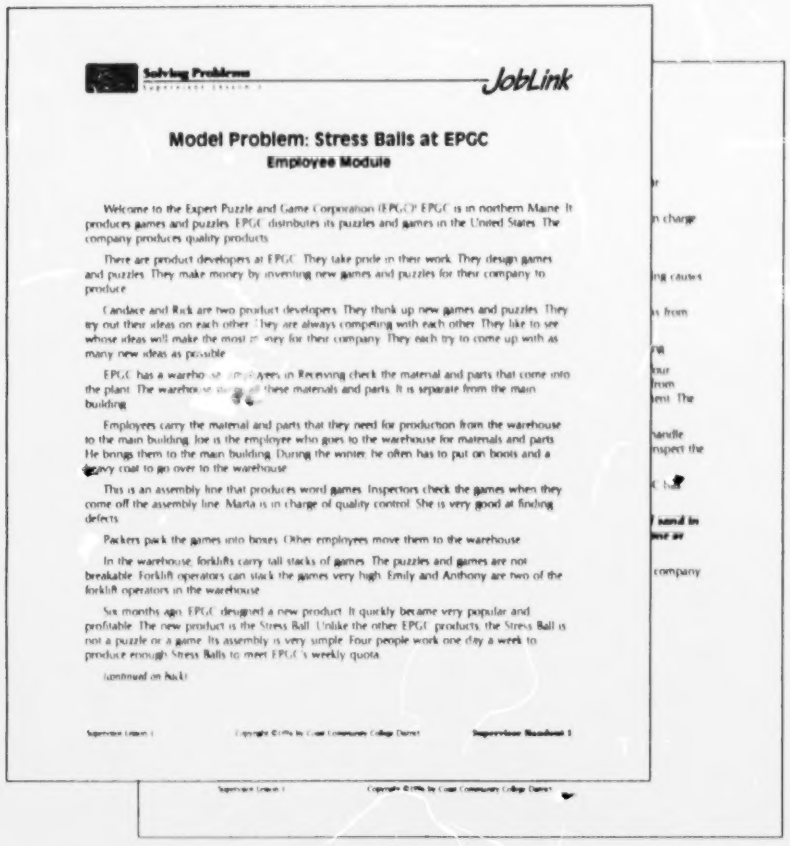

Solving Problems — JobLink

Model Problem: Stress Balls at EPGC

Employee Module

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Packers pack the games into boxes. Other employees move them to the warehouse.

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Six months ago, EPGC designed a new product. It quickly became very popular and profitable. The new product is the Stress Ball. Unlike the other EPGC products, the Stress Ball is not a puzzle or a game. Its assembly is very simple. Four people work one day a week to produce enough Stress Balls to meet EPGC's weekly quota.

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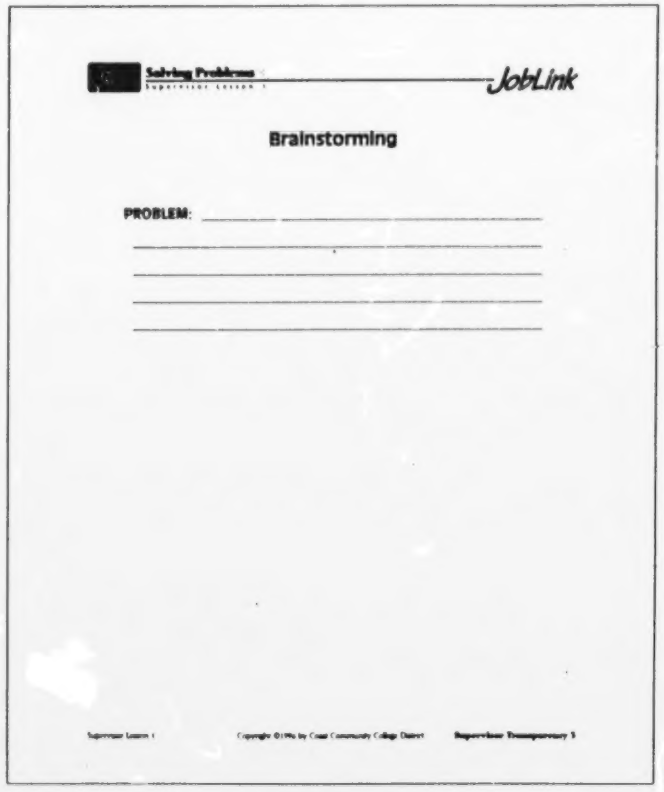
Supervisor Lesson 1 — Copyright ©1996 by Coast Community College District — Supervisor Handout 1

Supervisor Handout 1



Solving Problems — JobLink

Brainstorming

PROBLEM: _____

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Supervisor Transparency 3

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Activities

First Activity: 25 Minutes

1. "Model Problem"

(6-1) Supervisor Handout

A. **Distribute** "Model Problem: Stress Balls at EPGC" and **project** it.

B. **Ask** the supervisors to silently read the "Model Problem."

2 "Brainstorming"

(7-1) Supervisor Transparency

A. **Project** "Brainstorming". Note the problem identified at the top of the page: Customers are complaining because of the quality of the stress balls. The company is losing profits. The reputation of the company is suffering.

B. **Explain** the process of brainstorming.

C. **Brainstorm** possible causes of the defects in the "Model Problem" in one large group or in smaller groups.

D. **Encourage** all team members to volunteer their ideas. Remind them that in brainstorming: (a) No idea is bad; no idea is insignificant." (b) Employees should not criticize, ridicule, or otherwise discourage other employees' ideas. (c) A weak idea often helps generate a strong idea! (d) The group should consider all ideas.

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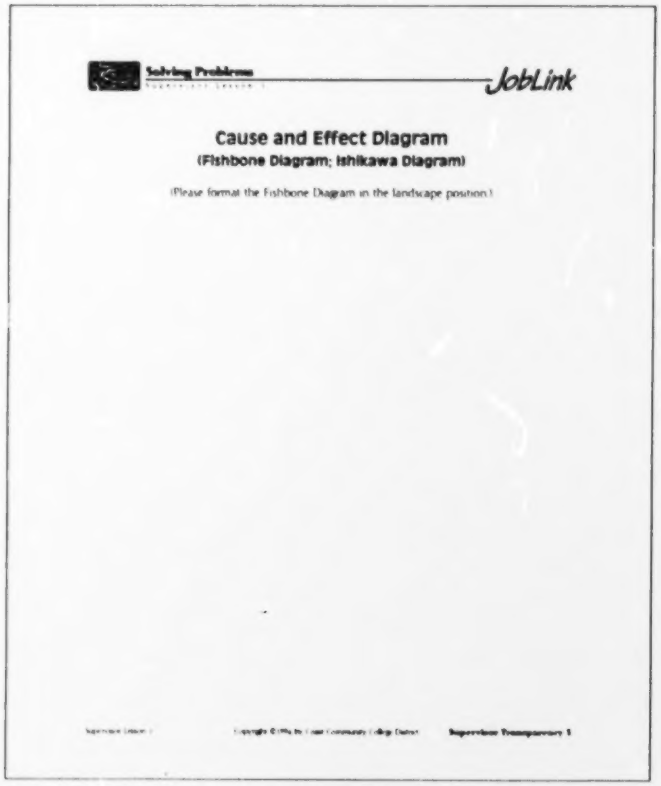

Solving Problems
Supervisor Lesson 1
JobLink

Cause and Effect Diagram
(Fishbone Diagram; Ishikawa Diagram)

(Please format the Fishbone Diagram in the landscape position.)

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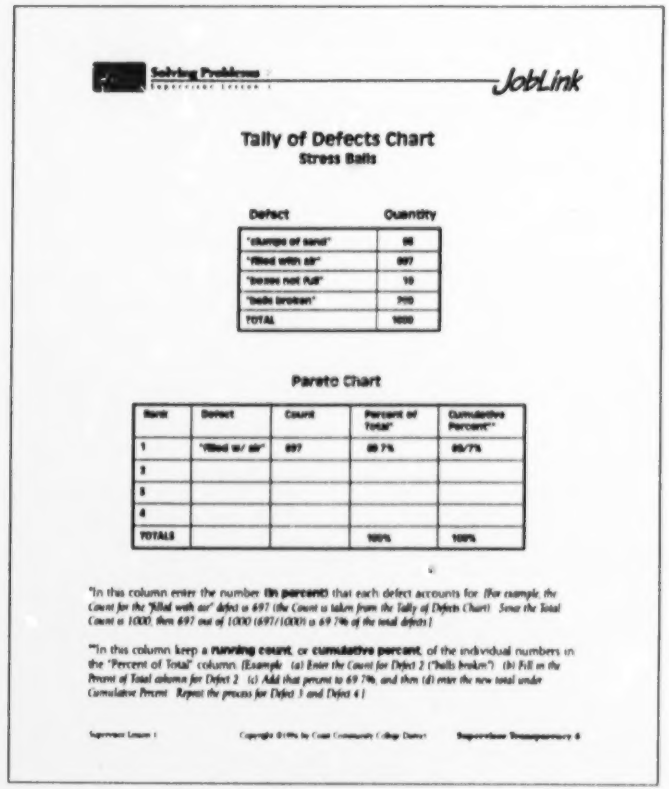
Supervisor Transparency 5



Solving Problems
Supervisor Lesson 1
JobLink

Tally of Defects Chart
Stress Balls

Defect	Quantity
"clumps of sand"	88
"filled with air"	697
"beans not full"	10
"balls broken"	205
TOTAL	1000

Pareto Chart

Rank	Defect	Count	Percent of Total*	Cumulative Percent**
1	"filled w/ air"	697	69.7%	69.7%
2				
3				
4				
TOTALS			100%	100%

*In this column enter the number **in percent** that each defect accounts for. (For example, the Count for the "filled with air" defect is 697 (the Count is taken from the Tally of Defects Chart). Since the Total Count is 1000, then 697 out of 1000 (697/1000) is 69.7% of the total defects.)

In this column keep a **running count, or **cumulative percent**, of the individual numbers in the "Percent of Total" column. (Example: (a) Enter the Count for Defect 2 ("balls broken"). (b) Fill in the Percent of Total column for Defect 2. (c) Add that percent to 69.7%, and then (d) enter the new total under Cumulative Percent. Repeat the process for Defect 3 and Defect 4.)

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Supervisor Transparency 6

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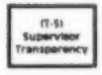
Activities

First Activity: (continued)

3. Analyze Cause and Effect



A. **Project** the "Cause and Effect Diagram". This diagram is often called a "Fishbone Diagram" *(because it resembles a fish skeleton)* and an "Ishikawa Diagram" *(named after its designer)*.

B. **Explain** Cause and Effect analysis.

C. **Complete** a Cause and Effect analysis of the "Model Problem" with the group(s).

4. Ranking Priorities: Pareto Analysis

A. **Project** the "Tally of Defects and Pareto Chart".

B. **Discuss** the "Tally of Defects Chart." **Remind** supervisors to refer to the "Model Problem," where the frequencies of these defects are listed.

C. **Explain** Pareto Analysis. Supervisors will rank the defects according to their frequency and use this ranking to determine which problems to focus on solving. For example, if a majority of the defects can be eliminated by focusing on only two problems, the team's energy will best be put to use trying to solve those two problems. *(Note: In a real situation, cost factors also must also be considered. A company may find it less expensive to reject defective parts than to eliminate the cause of those defects.)*

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Supervisor
Handout 7, Transparency 8

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Activities

First Activity: (continued)

D. After teams rank the defects, **tell** teams to choose which defects to eliminate. **Explain** that they will later chart each of the chosen defects individually on the "Identifying Potential Causes of Problem Chart" *(to be distributed and explained later)* and then identify its potential cause.

E. **Tell** teams to continue working together or as one large group with the instructor. Then **explain** that teams are (1) to rank the defects on the "Tally of Defects Chart," (2) to copy defects onto the "Pareto Chart," and (3) to rank defects by frequency as they list them in the "Defect" column.

5. Identifying Potential Causes of Problem

A. **Explain** the "Corrective Action Plan".

B. **Tell** the teams to decide which of the problems they want to try to solve.

C. **Ask** the teams to begin working together to develop a "Corrective Action Plan". **Explain** how they are to fill in the "Steps to correct defect:" on the chart for each of the chosen problems.

6. Presenting Solutions

A. **Ask** each team to present its plan to the rest of the group.

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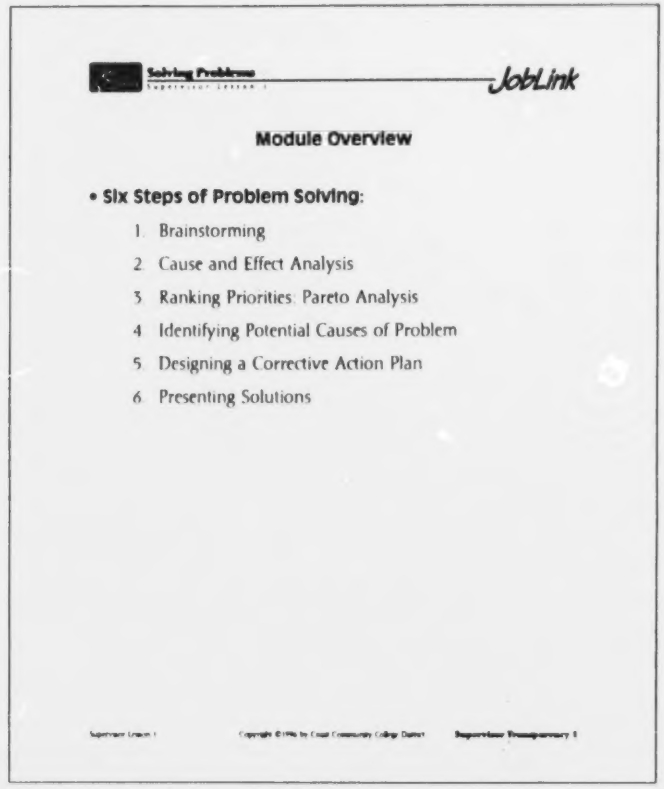

Supervisor Transparency 1

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Activities

Second Activity: 25 Minutes

1. **Project** the "Module Overview" and **review** the Six Steps of Problem Solving.

2. **Explain** that supervisors will choose a real problem from their workplace and develop "The Real Problem" for their employees to solve in Lesson 6 of the Employee Module.

3. **Tell** teams to brainstorm possible problems to present. **Remind** them that problems should have multiple components that can be ranked on a Pareto Chart.

4. **Ask** teams to choose their problems.

5. **Instruct** teams to write a presentation of the problem on "The Real Problem" handout.

6. **Tell** teams to write the answers to the problem for the various handouts ("Cause and Effect Diagram," "Tally of Defects and Pareto Chart," "Potential Causes of Problem," and "Corrective Action Plan").

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Name _____ IC-8

Six Steps of Problem Solving

1. Brainstorming
2. Cause and Effect Analysis
3. Ranking Priorities: Pareto Analysis
4. Identifying Potential Causes of Problem
5. Designing a Corrective Action Plan
6. Presenting Solutions

Supervisor Handout 8

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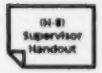
Activities

Ending: 5 Minutes

1. **Collect** and **review** the problem(s).



2. **Distribute** the "Six Steps of Problem Solving" cards.

3. **Say** good-bye.

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JobLink

Winning At Work

Solving Problems

Finding Solutions That Work

Supervisor Lesson 2

Lesson Description

There are many different Problem Solving models. Many of them contain the components presented in this module. It is important to point out to supervisors that Problem Solving models differ from company to company and that the steps covered in this module may not exactly parallel the steps used by their company.

Second Hour:

The supervisors problem-solve the real problem they developed for the employees. They also review and critique the employees' solutions and compare their solutions with those of the employee Module.

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Objectives

By completing this lesson, supervisors will be able to:

1. **Use** Problem Solving steps to solve the "Model Problem."
2. **Develop** "The Real Problem" for Lesson 6 of the Employee Module.
3. **Evaluate** solutions they develop as well as those developed by employee teams.

Materials Needed

Hardware

1. Overhead projector
2. Transparency markers
3. Flip chart or whiteboard
4. Whiteboard markers
5. A folder for "The Real Problem"
6. "Model Problem" audiotape with accompanying pictures
7. Stress Balls (or pictures of Stress Balls)

Transparencies

"The Real Problem" (Supervisor Trans. 8)
"Corrective Action Plan" (Sup. Trans. 7)
"Summary of Plans" (Sup. Trans. 9)

Materials Needed

Handouts

"The Real Problem" (Supervisor Handout 7)
Corrective Action Plan" (Sup. Handout 6)
"Summary of Plans" (Sup. Handout 8)

Classroom Set-up

Total Time: 60 minutes

Second Hour

Opening- Large Group	5 min.
First Activity- Small Groups	50 min.
Ending- Large Group	5 min.

Key Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet

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Activities

Opening: 5 Minutes

1. **Have** supervisors sign in and wear name tags *(if necessary)*.
2. **Welcome** the supervisors.

3. **Divide** the supervisors into groups of 4 to 6 if the group is large; keep everyone in one group if there are few supervisors.

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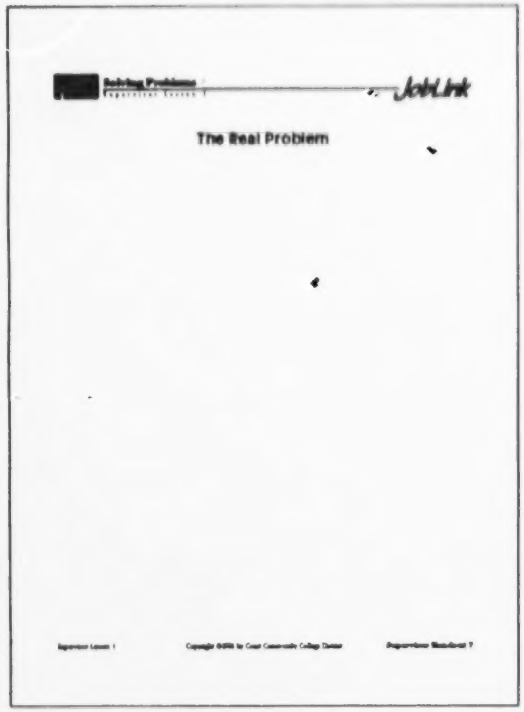
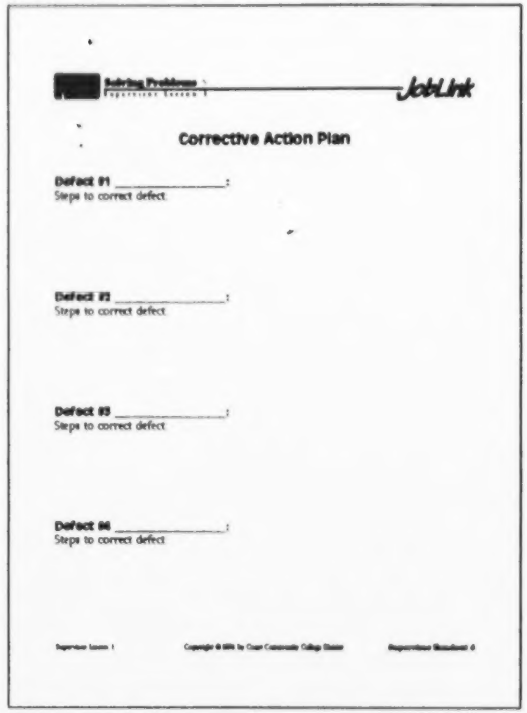
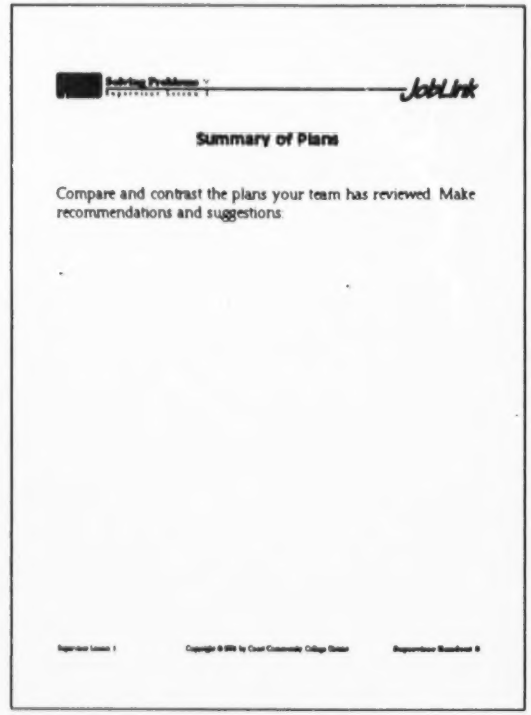


Supervisor
Handout 7, Transparency 8



Supervisor
Handout 6, Transparency 7



Supervisor
Handout 8, Transparency 9

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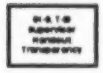
Activities

First Activity: 45 Minutes

1. **Review** "The Real Problems" that supervisors developed for the Employee Module.
2. **Follow** the "Six Steps of Problem Solving" up to the design of a "Corrective Action Plan".

3. **Present** the plan(s) to the group(s).

4. **Read** the "Corrective Action Plans" designed by the Employee Module teams.
5. **Compare** and **critique** the plans.



6. **Summarize** the plans on the "Summary of Plans" handout.

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Activities

Ending: 5 Minutes

1. **Present** the summaries, if time permits.
2. **Say** good-bye.

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Model Problem: Stress Balls at EPGC

Employee Module

Welcome to the Expert Puzzle and Game Corporation (EPGC)! EPGC is in northern Maine. It produces games and puzzles. EPGC distributes its puzzles and games in the United States. The company produces quality products.

There are product developers at EPGC. They take pride in their work. They design games and puzzles. They make money by inventing new games and puzzles for their company to produce.

Candace and Rick are two product developers. They think up new games and puzzles. They try out their ideas on each other. They are always competing with each other. They like to see whose ideas will make the most money for their company. They each try to come up with as many new ideas as possible.

EPGC has a warehouse. Employees in Receiving check the material and parts that come into the plant. The warehouse stores all these materials and parts. It is separate from the main building.

Employees carry the material and parts that they need for production from the warehouse to the main building. Joe is the employee who goes to the warehouse for materials and parts. He brings them to the main building. During the winter, he often has to put on boots and a heavy coat to go over to the warehouse.

This is an assembly line that produces word games. Inspectors check the games when they come off the assembly line. Marta is in charge of quality control. She is very good at finding defects.

Packers pack the games into boxes. Other employees move them to the warehouse.

In the warehouse, forklifts carry tall stacks of games. The puzzles and games are not breakable. Forklift operators can stack the games very high. Emily and Anthony are two of the forklift operators in the warehouse.

Six months ago, EPGC designed a new product. It quickly became very popular and profitable. The new product is the Stress Ball. Unlike the other EPGC products, the Stress Ball is not a puzzle or a game. Its assembly is very simple. Four people work one day a week to produce enough Stress Balls to meet EPGC's weekly quota.

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Model Problem: Stress Balls at EPGC
(continued)

The Stress Ball is a strong balloon that is pressure-filled with sand. Each of the four employees is responsible for one part of the manufacturing process.

One employee brings the sand and balloons from the storage room. He or she is in charge of filling the injection machine with sand.

Another employee fits 24 balloons over the filling tubes.

When the balloons are over the tubes, the third employee pulls a handle. The pulling causes the machine to use pressure to push sand into the balloons.

After the balloons are full, all four employees work together to remove the balloons from the filling tubes. They squeeze out air and tie a knot in each balloon.

A fourth employee inspects the Stress Balls and packs them into cartons for shipping.

The company manufactures Stress Balls only one day a week. Management takes four employees away from their usual jobs to make Stress Balls. Three employees are Rick from Product Development, Marta from Quality Control, and Joe from the Storage Department. The company chooses a different employee each week to take the fourth position.

Marta gets the material and fills the injection machine with sand. Joe pulls the fill handle. Rick and the fourth worker take turns placing the balloons over the tubes. They also inspect the completed Stress Balls.

At first, there were no problems in the Stress Ball department. However, lately EPGC has been receiving many customer complaints.

There are many different complaints. Some Stress Balls have large lumps of sand in them. Others have air in them. Some packed boxes of Stress Balls are missing one or two balls. Some boxes of Stress Balls have broken balls inside.

These problems are costing EPGC profits. They are hurting EPGC's reputation as a company that produces quality products.

You are going to solve EPGC's problem!

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Brainstorming

PROBLEM: _____

_____

_____

_____

_____

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Cause and Effect Diagram
(Fishbone Diagram; Ishikawa Diagram)

(Please format the Fishbone Diagram in the landscape position.)

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Tally of Defects Chart
Stress Balls

Defect	Quantity
"clumps of sand"	93
"filled with air"	697
"boxes not full"	10
"balls broken"	200
TOTAL	1000

Pareto Chart

Rank	Defect	Count	Percent of Total*	Cumulative Percent**
1	"filled w/ air"	697	69.7%	69/7%
2				
3				
4				
TOTALS			100%	100%

*In this column enter the number **(in percent)** that each defect accounts for. *[For example, the Count for the "filled with air" defect is 697 (the Count is taken from the Tally of Defects Chart). Since the Total Count is 1000, then 697 out of 1000 (697/1000) is 69.7% of the total defects.]*

In this column keep a **running count, or **cumulative percent**, of the individual numbers in the "Percent of Total" column. *[Example: (a) Enter the Count for Defect 2 ("balls broken"). (b) Fill in the Percent of Total column for Defect 2. (c) Add that percent to 69.7%, and then (d) enter the new total under Cumulative Percent. Repeat the process for Defect 3 and Defect 4.]*

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Identifying Potential Causes of Problem Chart
Stress Balls

Defect	Potential Cause	Potential Cause	Potential Cause
"filled with air"			

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Corrective Action Plan

Defect #1 _____:
Steps to correct defect:

Defect #2 _____:
Steps to correct defect:

Defect #3 _____:
Steps to correct defect:

Defect #4 _____:
Steps to correct defect:

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The Real Problem

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Summary of Plans

Compare and contrast the plans your team has reviewed. Make recommendations and suggestions:

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lame _____ (C-6)

Six Steps of Problem Solving

1. Brainstorming
2. Cause and Effect Analysis
3. Ranking Priorities: Pareto Analysis
4. Identifying Potential Causes of Problem
5. Designing a Corrective Action Plan
6. Presenting Solutions

Name _____ (C-6)

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Module Overview

- **Six Steps of Problem Solving:**
  1. Brainstorming
  2. Cause and Effect Analysis
  3. Ranking Priorities: Pareto Analysis
  4. Identifying Potential Causes of Problem
  5. Designing a Corrective Action Plan
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